GRANDE RONDE BASIN FISH HABITAT ENHANCEMENT PROJECT

1998 Annual Report

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TABLE OF CONTENTS

Page

ABSTRACT 1

INTRODUCTION 2

DESCRIPTION OF PROJECT AREAS 7
- Joseph Creek Subbasin..... 7
- Wallowa Subbasin 7
- Upper Grande Ronde River Drainage 7

METHODS and MATERIALS 9
- **Implementation-Prework** 9
- **Implementation-Onsite** 10
- **Operations and Maintenance** 11
- **Monitoring and Evaluation** 11

RESULTS AND DISCUSSION: FIELD ACTIVITIES..... 13
- **Implementation-Prework** 13
  - Project Planning 13
  - Project Preparation 14
  - Riparian Lease Development and Procurement 15
  - Field Inventories 15
- **Implementation-Onsite** 16
  - Instream Structures 16
  - Planting 16
  - Fencing 17
  - Offsite Water Development 19
  - Miscellaneous Implementation Activities 19
- **Operations and Maintenance** 19
  - Landowner Coordination 19
  - Instream Maintenance 20
  - Revegetation 20
  - Fence Maintenance 20
  - Miscellaneous Operations & Maintenance 22
- **Monitoring and Evaluation** 23
  - Photopoint Establishment 23
  - Photopoint Picture Taking 23
  - Habitat Monitoring Transect Establishment & Data Summarization 23
  - Thermograph Data Collection and Summarization 23
  - Thermograph Data Analysis 23
  - Miscellaneous Monitoring & Evaluation 34

RESULTS AND DISCUSSION: PROGRAM ADMINISTRATION 37
Reports and Data Summaries 37
Budgets and Purchases 37
Program Development 37
Personnel 38
Contract Administration 38
Miscellaneous Administration 38

INTERAGENCY COORDINATION AND EDUCATION 39
Interagency Coordination 39
Education 40

LITERATURE 41

APPENDIX 1 - Fish Habitat Enhancement work in the Joseph Ck. & Wallowa subbasins..43

APPENDIX 2 - Fish Habitat Enhancement work in the Upper Grande Ronde Drainage ... 44

APPENDIX 3 – Photographs 45

APPENDIX 4 - McCoy Creek Electroshocking Surveys 51

APPENDIX 5 – News Articles 59

ABSTRACT

On July 1, 1984 the Bonneville Power Administration and the Oregon Department of Fish and Wildlife entered into an agreement to initiate fish habitat enhancement work in the Joseph Creek subbasin of the Grande Ronde River Basin in northeast Oregon. In July of 1985 the Upper and Middle Grande Ronde River, and Catherine Creek subbasins were included in the contract (Contract No. DE-BI79-84BP16114), and on March 1, 1996 the Wallowa River subbasin was added. The primary goal of ***"The Grande Ronde Basin Fish Habitat Improvement Project"*** is to access, create, improve, protect, and restore riparian and instream habitat for anadromous salmonids, thereby maximizing opportunities for natural fish production within the basin. This project provided for implementation of Program Measure 703 (C)(1), Action Item 4.2 of the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program (NWPPC, 1987), and continues to be implemented as offsite mitigation for mainstem fishery losses caused by the Columbia River hydro-electric system.

All work conducted by the Oregon Department of Fish and Wildlife is on private lands and therefore requires that considerable time be spent developing rapport with landowners to gain acceptance of, and continued cooperation with this program throughout 10-15 year lease periods. This project calls for passive regeneration of habitat, using riparian exclosure fencing as the primary method to restore degraded streams to a normative condition. Active remediation techniques using plantings, off-site water developments, and site-specific instream structures are also utilized where applicable. Individual projects contribute to and complement ecosystem and basin-wide watershed restoration efforts that are underway by state, federal, and tribal agencies, and local watershed councils.

Work undertaken during 1998 included: 1) Implementing 6 new projects in the Wallowa subbasin and 3 new projects in the Upper Grande Ronde drainage, which protect 3.5 miles of stream and 184.6 acres of habitat; 2) Planting and/or seeding 5.3 stream miles; 3) Establishing 49 new photopoints and retaking 190 existing photopoint pictures; 4) Monitoring stream temperatures at 10 locations on 6 streams; 5) Riparian fence and water gap maintenance on 92.7 miles of fence; and 6) Installing 1,647 feet of juniper rip rap using 331 whole juniper trees in 5 streams to stabilize eroding streambanks.

INTRODUCTION

Background

It is widely recognized that wild and naturally spawning populations of salmon and steelhead are at low levels throughout the Columbia River Basin as a result of impaired fish mainstem passage, blocked habitat, habitat degradation, fishing, predation and other factors. Habitat degradation and its causes within the Grande Ronde Basin have been well documented (Anderson and others, 1992; CTUIR, 1984; Henjum and others, 1994; Huntington, 1993; McIntosh and others, 1994; Sedell and Everest, 1991). Listings of Snake River salmonid populations through the Endangered Species Act led to increased efforts to implement ecosystem or watershed based approaches to species recovery within individual subbasins (Anderson and others, 1992; Huntington, 1994; Mobrand and Lestelle, 1997; NMFS, 1997; Wallowa Co.-Nez Perce, 1993). The intent of this project is to provide offsite mitigation for mainstem losses of habitat and fish productivity caused by the construction and operation of eight dams on the Columbia River. This is achieved through coordinated efforts to protect and improve spawning and rearing habitat, and improve fish passage.

Prior to implementation of this project, streams within the Grande Ronde River basin were examined as part of a study funded by Bonneville Power Administration (BPA), and undertaken by the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and the Oregon Department of Fish and Wildlife (ODFW). The study compiled the basic information necessary to identify, evaluate, prioritize, and recommend site-specific solutions to major problems impacting the anadromous salmonid resource and fisheries, and prepared an integrated overall plan for the study area (CTUIR, 1984). The identification, priority, and implementation of habitat work within these drainages represented a consensus among staff from ODFW, Tribal, and Federal entities (Appendices 1 and 2), and established an initial template from which to pursue fish habitat enhancement projects. In 1996 project areas were re-prioritized based on several factors, including: 1) review of work completed in the basin; 2) review of more recent watershed assessments such as those produced through funding from the Grande Ronde Model Watershed Program or local watershed groups; 3) and input from local district fisheries biologists.

Fisheries Status

The Joseph Creek subbasin has been an excellent producer of summer steelhead, and continues to be managed as a wild fishery. Summer steelhead redd counts from 1970 through 1984 indicated severe reductions of adults returning to this subbasin (Table 1). This downward trend showed signs of improvement from 1985 to 1989; however, the 1990-98 counts remain below desired levels. Summer steelhead escapement over Lower Granite Dam (which includes all wild and hatchery stocks entering Oregon and Idaho) has fluctuated a great deal but showed substantial improvements after 1981 when fish passage improvements were initiated. However, considerably lower counts in run years 1990, 1993, and 1994 are a cause of concern (Figure 1). Total escapement over Lower Granite improved in 1995 to 1997, but counts of the wild portion of the run which began in 1994, remain low, averaging 11.9% of the total run in the last five years.

TABLE 1. Summer steelhead spawning ground counts in the Joseph Creek subbasin, 1966 through 1998.

	AVERAGED COUNTS						LAST 5 YEARS ANNUAL COUNTS				
	1966-69	1970-74	1975-79	1980-84	1985-89	1990-94	1994	1995	1996	1997	1998
Redds Observed	496	85	26	87	428	237	145	30	85	102	166
Miles Surveyed	56	54	43	54	48	55	48	36	47	43.5	33
# Redds/Mile	8.9	1.6	0.6	1.6	8.9	4.3	3.0	0.8	1.8	2.3	4.9

NOTES:

1/ Streams included in the Joseph Creek subbasin steelhead spawning ground counts include: Butte, Chesnimnus (mainstem, north, and south forks), Crow, Devil's Run, Elk, Peavine, Swamp, and TNT Gulch Creeks. All of these creeks, however, may not be inventoried on any given year due to river conditions. This annual variation is reflected in the "Miles Surveyed" column.

2/ Joseph Creek steelhead counts consist solely of wild fish and are considered to be representative of other wild runs in the Grande Ronde Basin.

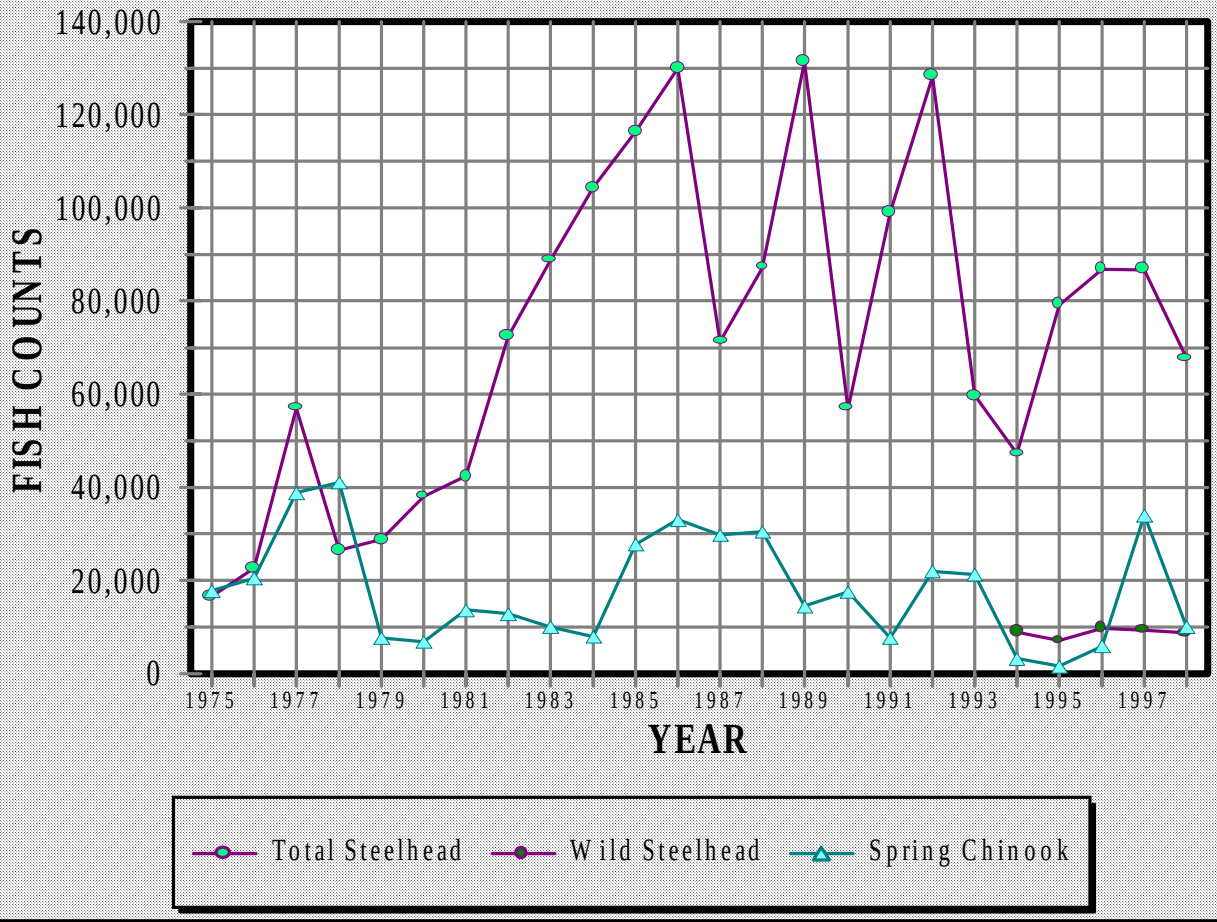
3/ Summer steelhead spawning ground counts were obtained from Kenneth L. Witty and Brad Smith, District Fisheries Biologists, Wallowa District, ODFW.

4/ In 1995 and 1996 streams were surveyed later than usual due to high flows. Many redds may have been washed out. Bill Knox, Assistant District Fishery Biologist, Wallowa District, ODFW.

The Wallowa River subbasin historically supported sockeye, coho, and fall chinook in addition to strong runs of steelhead and spring chinook. However, sockeye and coho are now extinct, and only small numbers of fall chinook remain, which generally spawn lower in the basin.

In the Upper Grande Ronde River drainage historical records also indicate excellent production of both summer steelhead and spring chinook, but chinook redd counts indicate that returns to the Upper Grande Ronde River drainage remain well below those observed in the late 1960's and early 1970's (Table 2). The 1994 and 1995 redd counts were the lowest on record since extensive surveys were initiated in 1986 (Carmichael, 1995). Spring chinook escapement over Lower Granite dam declined severely in run years 1991, 1994-1996, and 1998; with 1995 being the lowest run count on record (Figure 1). The wild fish component of the run has averaged 42% during the 1979-1996 time period (Swartz, 1996).

FIGURE 1. Summer Steelhead and Spring Chinook Counts over Lower Granite Dam.



SOURCE: Columbia River Fish Runs and Fisheries, 1938-1996, Status Report. Oregon Department of Fish and Wildlife, Washington Department of Fisheries, 1997, and Doug Case, O.D.F.W., Clackamas, OR.

NOTES:
For summer steelhead a run year is June 1 through May 31, while Chinook are counted by calendar year. Spring chinook counts include adults and jacks. Fish passage improvements and smolt transports began after 1981. Wild steelhead were counted separately from hatchery origin beginning in 1994.

TABLE 2. Spring chinook spawning ground counts in selected streams

Of the Grande Ronde River Basin, 1967 through 1998.											
	AVERAGED COUNTS						LAST 5 YEARS ANNUAL COUNTS				
	1967-69	1970-74	1975-79	1980-84	1985-89	1990-94	1994	1995	1996	1997	1998
Redds Observed	382	285	117	94	226	144	24	24	79	88	53
Miles Surveyed	35	27	24	27	31	46	45	46.7	40.7	29.5	29.5
# Redds/Mile	10.9	10.6	4.9	3.5	7.2	3.1	0.5	0.5	1.9	3.0	1.8

NOTES:

1/ Streams in this table include ODFW index spawning ground counts on the North Fork, South Fork, and mainstem Catherine Creek; mainstem Grande Ronde River; Sheep Creek; Lookinglass Creek; and the Minam River. Supplemental counts were not included.

2/ No spawning counts were conducted on Sheep Creek (6.0 miles) starting in 1996, or on the Grande Ronde River from the F.S. boundary to below Vey Meadows (5.5 miles) starting in 1997.

3/ Spring chinook spawning ground counts were obtained from Duane C. West, Jeff Zakel, & Tim Walters, and O.D.F.W. Fish Research, La Grande, OR.

Causes and Consequences of Declines

There are many reasons for declines of anadromous fish in the Grande Ronde River Basin since the mid-1970's, including: 1) problems with adult and juvenile passage that occurred following construction of Columbia and Snake River dams between 1938-1975 (ODFW/WDF, 1997). Anadromous fish must pass 8 dams enroute to spawning grounds in the basin. 2) Commercial, sport and Tribal demands for the fishery resource. 3) Degradation of spawning and rearing habitat throughout the basin. 4) A major forest fire, followed by a flash flood event in the Upper Grande Ronde headwaters during peak migration and spawning in August of 1989 resulted in decimation of the adult chinook run and their progeny (Boehne and others, 1989).

Observations in the Grande Ronde River basin indicate optimum spawning and rearing areas for summer steelhead and spring chinook are limited in large portions of these drainages by degradation of riparian and instream habitats (Noll, 1987; Anderson & others, 1992; Huntington, 1994). For example, approximately 70% of the large pool habitat in the mainstem Upper Grande Ronde River and 26% in Meadow Creek have been lost since 1941 (Sedell and Everest, 1991). The average percent shade cover over low gradient constrained, and low gradient unconstrained streams in the Grande Ronde Basin are 33% and 24%, respectively (Huntington, 1994).

Management practices that have contributed to habitat degradation within project areas include beaver trapping; livestock grazing; irrigation and cropland agriculture; timber harvest; road construction; mining, stream channelization, and introduction of exotic species. Several factors

associated with instream and riparian habitat degradation have limited natural production of salmonids in the Grande Ronde River basin, including: 1) High summer water temperatures, 2) Low summer flows, 3) Lack of riparian vegetation, 4) Poor habitat diversity, 5) Channel instability, and 6) Winter icing.

Considerable effort and money have been invested in trying to resolve mainstem dam passage problems. Tighter restrictions on ocean and river harvest of these stocks have also been implemented, and tribal salmon fishing in the basin ceased almost entirely since 1983. Despite these efforts, salmonid populations continued to decline. The National Marine Fisheries Service listed the Snake River portion of the Columbia River sockeye salmon run as an endangered species in December 1991. The Snake River wild portion of the summer and spring chinook runs were combined and listed as threatened in December 1994, along with the fall chinook. Bull trout and summer steelhead listings followed in 1997 and 1998.

Solutions

The Grande Ronde Basin Fish Habitat Enhancement Project is a logical and integral part of the species recovery process by implementing projects that establish long term riparian and instream habitat protection, and tributary passage improvement on private lands through riparian lease agreements. Planning for implementation of these projects includes the participation and involvement of private landowners, state and federal agencies, tribes, model watersheds, and watershed councils. Individual projects contribute to ecosystem and basin-wide watershed restoration and management efforts that are underway by these groups.

Out of basin variables (such as mainstem passage and harvest) are beyond the scope of this project, but the in-basin limiting factors mentioned above could be adequately addressed if proper habitat enhancement techniques are utilized. This program primarily relies on restoring natural vegetative recovery, floodplain connectivity and groundwater interactions, using riparian fencing in streams that have been impacted by livestock grazing. This method has proven to be effective in protecting and restoring streams (Beschta and others, 1991; Chaney and others, 1993). In more severely degraded areas, fencing, in combination with placement of instream structures and riparian plantings, can accelerate the natural recovery process (Chaney and others, 1993; ISG, 1996; Huntington, 1994; NMFS, 1997, Roper and others, 1998). The Grande Ronde Basin Fish Habitat Enhancement Project incorporates both passive and active techniques that provide optimum habitats for returning adults and their progeny, and help achieve the overall goal of maximizing natural anadromous fish production in the Grande Ronde River basin.

DESCRIPTION OF PROJECT AREAS

Five of the ten subbasins within the Grande Ronde Basin are included in the project areas. Not included are the Minam, Lower Grande Ronde, Wenaha, Imnaha, and Inner Snake subbasins. Those subbasins are comprised mostly of Forest Service, National Recreation Area, or Wilderness lands (Figure 2).

JOSEPH CREEK SUBBASIN:

The Joseph Creek subbasin (part of Federal Hydrologic Unit Number 17060106) constitutes a major drainage within the Grande Ronde Basin of northeast Oregon. It drains approximately 635 square miles of the 5,299 square mile Grande Ronde Basin. It contains an estimated 225 miles of anadromous fish habitat, and is managed for wild summer steelhead. It empties into the Grande Ronde River 4.3 miles above the confluence of the Grande Ronde and Snake rivers (Figure 2). Approximately 75 percent of the Joseph Creek subbasin is within the project area. Not included in the project area is lower Joseph Creek in Washington state, and the Cottonwood Creek drainage which enters Joseph Creek 4.4 miles above Joseph Creek's confluence with the Grande Ronde River (Figure 2).

Within the project area 120.5 miles of stream were identified as in need of habitat enhancement; 75 miles on private land and 45.5 miles on public lands (Appendix 1).

WALLOWA RIVER SUBBASIN:

The Wallowa River subbasin (part of Federal Hydrologic Unit Number 17060105) drains approximately 721 square miles and includes approximately 168 miles of streams used by spring chinook and summer steelhead. It starts at the confluence of the Grande Ronde and Wallowa rivers; 81.4 miles upstream from the confluence of the Grande Ronde and Snake rivers (Figure 2). A large portion of the drainage originates in the northern half of the Eagle Cap Wilderness.

Within the project area 43.0 miles of stream were identified as in need of habitat enhancement, all within private lands (Appendix 1).

UPPER GRANDE RONDE RIVER DRAINAGE:

The Upper Grande Ronde River drainage (Federal Hydrologic Unit Number 17060104) includes the Upper Grande Ronde, Middle Grande Ronde and Catherine Creek subbasins. It drains approximately 1,650 square miles of the 5,299 square mile Grande Ronde Basin, and contains an estimated 660 miles of anadromous fish habitat. It also starts at the confluence of the Grande Ronde and Wallowa rivers at Rondowa (Figure 2), draining the western half of the Eagle Cap Wilderness and the northern portion of the Elkhorn Mountain range.

Within the project area 211.8 miles of stream were identified as in need of habitat enhancement; 116.8 miles on private lands and 95.0 miles on public lands (Appendix 2).

GRANDE RONDE BASIN

BPA SPONSORED FISH PROJECTS AS OF 1997

Projects

- Habitat Projects
- Research Projects
- Other Watershed Projects Preliminarily Mapped
- Land Purchase for Nez Perce Tribe

Land Management

- Forest Service
- Wilderness Area
- National Recreation Area
- Bureau of Land Management
- Indian Reservation Lands
- State Lands
- Private, Unknown or Other

Base Data Derived From 1:100,000 Scale Sources

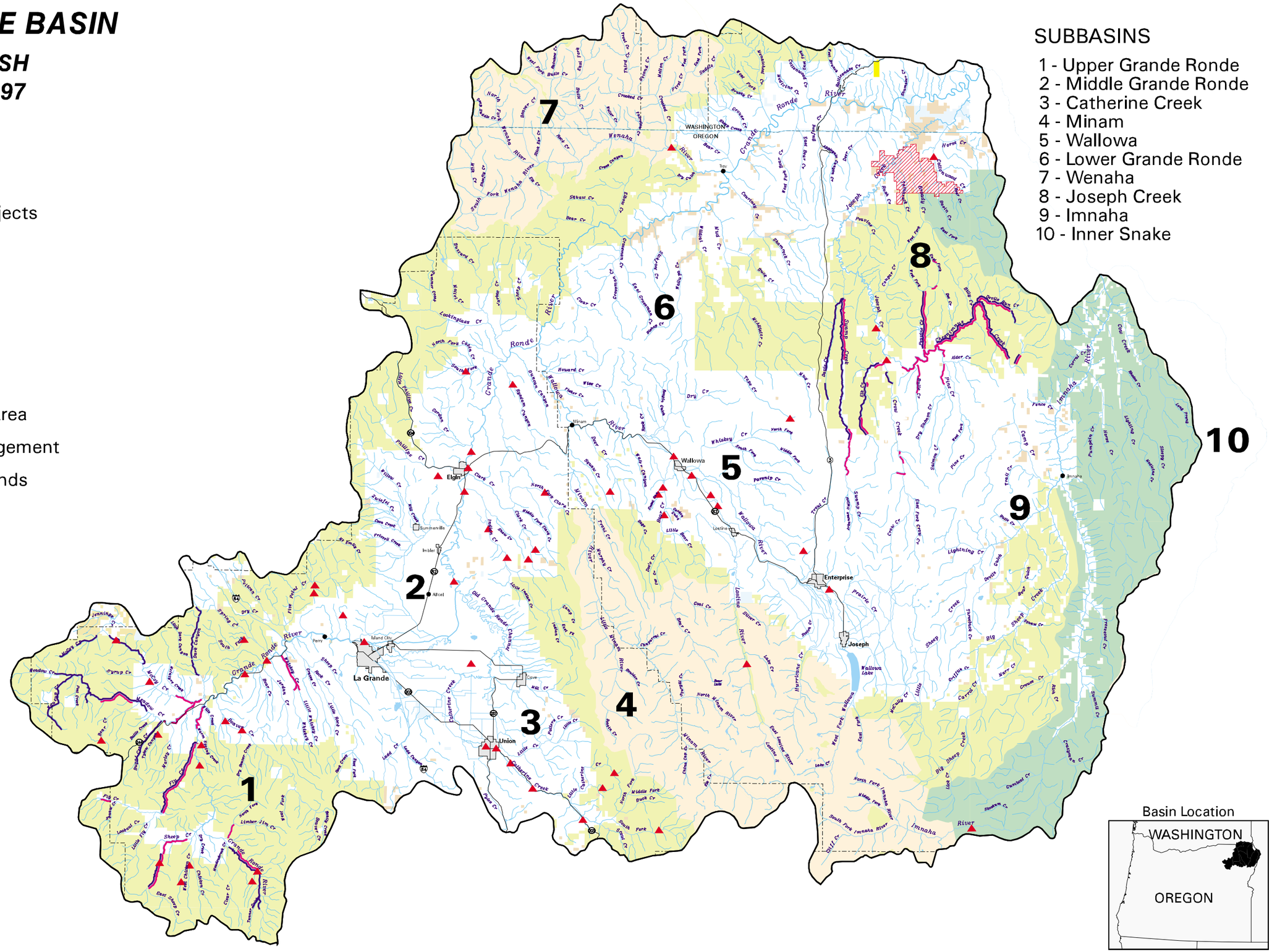
Map Date 3/27/97

N W E S

KILOMETERS 0 5 10 15 20

MILES 0 5 10 15 20

BONNEVILLE POWER ADMINISTRATION GIS GEOGRAPHIC INFORMATION SYSTEM



Basin Location

METHODS AND MATERIALS

The goal of this program is to optimize spring/summer chinook and summer steelhead smolt production and survival within the Grande Ronde River Basin using habitat enhancement measures. To accomplish this goal, work will progress in the following phases:

1. IMPLEMENTATION - Prework
2. IMPLEMENTATION - Onsite
3. OPERATIONS and MAINTENANCE
4. MONITORING and EVALUATION

IMPLEMENTATION - Prework:

This is one of the most time consuming and important phases of the program, in which landowner relations and goals of the project are established, and work activities scheduled. Prior to project construction the following activities are conducted:

Project Planning

Project planning includes design, layout and mapping of all work to be done onsite, landowner coordination, development of contracts and contract specifications, and obtaining necessary work permits.

Project Preparation

Prior to signing leases or construction contracts, all lease boundaries and work sites must be identified, staked, and agreed upon by the landowner and/or contractor. Work sites may include easements or right-of-ways, fences, livestock watering gaps, instream structures, offsite water developments, planting, and miscellaneous lease or construction related areas.

Riparian Lease Development and Procurement

Riparian lease development and procurement includes meeting with landowners and/or their legal representatives specifically for the purpose of developing an acceptable lease or cooperative agreement text. Lease documents must be signed, notarized, and filed in the county courthouse.

Field Inventories

These may include prework stream surveys, and photographic documentation to provide baseline information on habitat condition and potential for improvement prior to any onsite implementation.

IMPLEMENTATION - Onsite:

Onsite implementation encompasses the actual on-the-ground work phase of the program and may include any or all of the following:

Instream Structures

During late summer and early fall when stream flows are lowest, instream structures may be installed in streams at locations preselected by fishery biologists and/or hydrologists. Instream structures will be installed to specifically address the factors limiting fish production in each stream reach. Structures of various types may be used to provide optimum pool/riffle ratios, raise stream water tables, collect spawning gravels, and increase the amount of large woody debris, thereby increasing quantity and quality of spawning and rearing habitats. Rock jetties or deflectors may be necessary under some circumstances, but bioengineered structures will be the primary methods used to stabilize streambanks. Boulders may be used to create small rearing pools and hiding cover, and may be used as anchor points for cabling large woody debris.

Planting

During the early spring, shrub and/or tree species may be planted at preselected locations along streams within project areas. Since high summer water temperatures are a major limiting factor, plantings will be made to provide stream shade, thereby reducing summer water temperatures and increasing salmonid utilization of streams. The maximum shade attainable for most streams in project areas is estimated at about 80 percent.

Plantings may also be done in areas of poor bank stability as a preferred alternative to the more costly rock deflectors. Plantings will be done only after riparian fences have been installed to ensure their protection. During the fall, areas disturbed during implementation activities will be seeded to stabilize soils and discourage weed growth.

Fencing

Destruction of streamside vegetation by domestic livestock has been a major problem within project areas. To provide protection from livestock, and thereby promote rapid recovery of existing and planted vegetation, fences will be constructed along riparian zones within project areas. When negotiating fence locations with landowners, preference will be given to projects where fences are located well outside the normal flood prone area.

Offsite Water Developments

In an attempt to reduce the number of watering gaps in riparian fences (thereby reducing fence construction and maintenance costs), and to encourage livestock utilization of vegetation away from riparian areas, offsite water sources will be developed.

Miscellaneous Implementation Activities

Cooperator sign boards denoting riparian enhancement projects as cooperative efforts between BPA, ODFW and private landowners will be installed at high visibility sites along completed riparian enhancement project areas. Other activities may be required to complete a fish habitat enhancement project and meet landowner needs.

OPERATIONS AND MAINTENANCE:

Operations and maintenance activities will begin the year following implementation and include:

Landowner Coordination

Ongoing coordination and cooperation between the landowners and ODFW is a vital element to ensure long-term project success after the initial implementation is completed.

Fence Maintenance

Biannual inspections of all project areas will be made. Following these inspections all fence maintenance will be done. Stream cross fences and/or water gap cross fences may be installed or removed during these inspections, or at any time during the year to meet landowner needs and to ensure maximum recovery within the projects.

Instream Maintenance

Annual inspections of all instream structures will be done, usually in combination with fence maintenance inspections. Instream structures are generally expected to provide long lasting benefits with low maintenance. Instream structure maintenance will be done on a case by case basis, depending on impact of the structure failure on riparian recovery, streambank stability and/or landowner needs.

Revegetation

Replanting and/or seeding of project areas may be necessary to produce adequate stream shading, bank stability, or cover within the 15-year lease period. Events such as severe flooding and bank erosion, or when recovery is unacceptably slow due to lack of parent stock may result in a decision to replant an area.

Miscellaneous Operations & Maintenance Activities

These activities may include vehicle, ATV, and equipment maintenance and repair. Other activities include installing or replacing project signs, and efforts to control wildlife damage.

MONITORING AND EVALUATION:

Whenever possible, some level of monitoring will be established prior to project implementation, and will continue beyond the term of the lease agreement if the landowner is willing. Individual projects will be monitored using one or more of the following methods:

Photopoint Establishment

Photopoint establishment will include locating and placing permanent markers at sites from which photographs can be taken at regular intervals. These photographs are a primary means of documenting physical and biological changes along streams. Also associated with photopoint establishment is development of a photopoint notebook for each project area. These notebooks contain maps of all photopoint locations, instructions on taking the photographs, and labeled slides and prints.

Photopoint Picture Taking

Standardized pictures will be taken from preselected photopoints prior to implementation on any project area and then for the next two years immediately following completion of a project. Once these initial photos are obtained the frequency of photopoint picture taking may diminish to once every two to three years.

Habitat Monitoring Transect Establishment

Within selected project areas permanent habitat monitoring transects will be established. Specific measurements will then be taken along each transect to record channel morphology, and vegetative characteristics. These measurements will be repeated at regular intervals and compared with original measurements as a means of quantitatively measuring environmental changes through time.

Habitat Monitoring Transect Data

Immediately after establishing habitat monitoring transects, baseline data will be collected. Data collection will be done on the first year following completion of implementation activities and thereafter at approximately 3 to 5 year intervals.

Thermograph Data Collection and Summarization

Thermographs will be installed at various locations throughout the project area. Thermograph data will be recorded, collected, summarized, and graphed on a regular basis. The purpose of this type of monitoring is to detect changes in stream water temperatures that may occur over the years within fenced-off, recovering riparian areas.

Miscellaneous Monitoring and Evaluation

Miscellaneous monitoring and evaluation activities may include chinook salmon and steelhead redds counts, biological surveys (i.e. electroshocking or avian species use) and evaluating riparian vegetative recovery and/or planting success.

RESULTS AND DISCUSSION: FIELD ACTIVITIES

Note: Beginning in 1995 the Grande Ronde Basin Fish Habitat Enhancement Program undertook implementation, maintenance and monitoring activities in the Camas Creek drainage of the North Fork John Day subbasin. These activities were funded by, and coordinated through the John Day Fish Habitat Enhancement Program: Project No. 8402100; Contract No. DE-B179-84BP17460.

The following field activities were completed in 1998:

IMPLEMENTATION - Prework:

Project Planning

Design and Layout

Identification of property boundaries for privately owned lands along priority streams in the Joseph Creek and Upper Grande Ronde drainages was the first step in the planning habitat enhancement work. The majority of mapping for private lands was completed in 1988, and aerial photographs (8 inches/mile) were taken by BPA on many project streams in 1987. Additional mapping in 1998 included portions of the Wallowa River and Meadow Creek. Landownership maps were purchased at county courthouses, and any additional aerial photographs of potential projects were ordered from the ASCS Aerial Photography Field Office.

Lease maps were completed on 5 projects on the Wallowa River (Burrows, Cox, Johnson, McCrae, and Wiseman properties), and one project on Meadow Creek (Alta Cunha Ranches).

Landowner Coordination

A great deal of time was spent in communication with landowners throughout the project area to develop riparian leases or coop agreements, and plan onsite work:

The biologist and technician met with several landowners in Wallowa County to discuss potential projects on the Wallowa River, Hurricane Creek and Prairie Creek.

The biologist and Alan Bahn of NRCS met twice with Shauna Mosgrove to discuss projects on Meadow Creek and the Grande Ronde River. The biologist later met with John Habberstad and Shauna Mosgrove on Meadow Creek to discuss property boundary fences, road easements, timber harvest, fence layout and potential construction of an airstrip.

The biologist met with Dick Levy of Pendleton Ranches to look at potential fence projects on Snipe and Cooper creeks in the North Fork John Day basin. Both creeks were in poor condition with high percentages of unstable banks, down cutting, and lack of riparian vegetation.

Developing Contracts and Contract Specifications

High tensile fence specifications were written for 3.8 miles of fence on the Meadow Creek project.

Obtaining Work Permits

The biologist assisted Lyle Kuchenbecker of the GRMWP with a NEPA compliance checklist for the Meadow Creek/A. Cunha project. State Forestry permits were obtained for this project. DSL permits were obtained for continuing flood repairs in Wallowa county streams.

Project Preparation

A total of 1.4 miles of fence was staked along 0.7 miles of the Wallowa River on the Cox, Johnson, McCrae and Wiseman properties. Several areas in need of bank stabilization were identified. ODFW personnel delivered fence materials to these job sites.

Approximately 3.8 miles fence line and two water gaps was flagged on the Meadow Creek/A. Cunha Ranches property. Sites were also identified for removing portions of the old railroad grade where floodplain function is restricted, and for additions of large wood next summer. Alan Bahn of the NRCS helped plan and stake out the project, and completed the cultural resource survey. ODFW personnel delivered fence materials to the job site.

Approximately 0.4 miles of fence line was staked on Beaver and Dry Beaver creeks.

One-quarter mile of Cooper Creek was staked out on the Pendleton Ranches property.

Riparian Lease Development and Procurement

Considerable time was spent contacting several prospective landowners, resulting in the signing of 5 riparian leases and 3 cooperative agreements:

Along the Wallowa River lease agreements were signed by four adjacent landowners, and another landowner signed a 15-year cooperative agreement. These projects will protect 0.7 miles of stream and 17.2 acres of riparian habitat.

In the Upper Grande Ronde subbasin a lease agreement was signed with Alta Cunha Ranches. The landowner showed a great deal of foresight by allowing us to place the fence line completely out of the floodplain and up on the ridge tops in most places. The average width of the riparian corridor is over 650 feet, and the eventual goal (at the end of the lease agreement) is to be able to incorporate these areas into a comprehensive multi-pasture grazing scheme. The riparian lease was signed on August 19, 1998 and will protect 1.8 miles of stream and about 140 acres of habitat. The landowner is also interested in fencing another mile of the Grande Ronde River, which we will complete in 1999.

A ten-year cooperative agreement was signed with Forrest Warren to fence off 0.25 miles of a tributary to Coon Creek, in the Middle Grande Ronde subbasin. Another cooperative agreement was signed with Norman Kerr to fence off 0.25 miles of Little Creek, in the Catherine Creek subbasin. ODFW Fish Restoration & Enhancement fencing materials totaling $3,551 were used to complete both projects. Under this type of agreement the landowners will perform all of the fence maintenance.

The five leases mentioned above were filed in their respective county courthouses. An addendum to the riparian lease agreement for the Hurricane Creek/Irby property was completed, and was filed in the Wallowa County courthouse.

Prospective Projects:

John and Jim Habberstad visited our office to discuss fencing 1.1 miles of Meadow Creek immediately downstream of the A. Cunha property. They are mainly interested in managing their property for big game, and therefore were interested in a very wide riparian corridor. An onsite meeting was conducted this fall. Mr. Habberstad reviewed a draft lease agreement and had no major problems with it, and he was very impressed with the work accomplished on the A. Cunha ranches property just upstream.

Dick Levy of Pendleton Ranches gave us permission to stake out portions of Snipe and Cooper creeks in the NF John Day subbasin, and is expected to sign a lease agreement in 1999.

Peter Barry contacted us regarding a potential fence project on Dry Creek in the Wallowa River subbasin.

The biologist and La Grande Assistant District Biologist met with Mike Wilgabee on Dry Creek (tributary of the Grande Ronde River) to discuss fencing off 1/8 mile of stream and constructing some spring developments.

The Barry and Cheryl Cox expressed interest in fencing part of Whiskey Creek, which enters the Wallowa River on their property.

The technician met with Rex Christensen and Flip Houston on Beaver Creek to discuss adjoining a small piece (0.2 miles) of the mouth of Dry Beaver Creek to the existing fence project on Beaver Creek. This work is scheduled for 1999.

Field Inventories

Several project areas were inspected to determine past planting and natural revegetation success, and to identify 1998 planting sites.

ODFW and Oregon Department of Agriculture staff conducted a noxious weed inspection on the Meadow Creek/A. Cunha and Habberstad properties. Leafy spurge was found and biological agents released on the sites.

Pre-project surveys were conducted on the Meadow Creek/A. Cunha Ranches property. Unstable streambanks, lack of large woody debris and high summer temperatures were identified as some of the primary limiting factors. Spot checks of temperatures showed the stream reaching 84 degrees F in August, forcing fish to concentrate in very small pockets of cold seeps wherever they could be found (Appendix 3).

Preliminary surveys were conducted and some pre-work photographs were taken on the Meadow Creek/Habberstad property. Unstable streambanks, lack of riparian vegetation and large woody debris were identified as some of the primary limiting factors.

A walk-through survey was done on the Upper Grande Ronde River/A. Cunha property prior to mapping and staking.

IMPLEMENTATION - Onsite:

Instream Structures

Two large root wads were placed and cabled into Hurricane Creek (Jones property).

Two whole cottonwood trees were cabled into the streambank on the Wallowa River/Wiseman property, and 150 feet of juniper riprap was placed on 4 sites using 25 trees. Ten large trees were placed and cabled in on the Wallowa River/McCrae property, and two large tree limbs placed on the Cox property.

Five large trees were placed by helicopter in the Upper Grande Ronde River by Crown Pacific timber crews, and cabled in by ODFW crews.

Three sections of old railroad grade totaling 1,440 feet were leveled with a D6 cat by MiTrac Construction on Meadow Creek (Appendix 3). This will restore proper floodplain function in places where the railroad had disconnected adjacent wetlands from the main channel. At one site soil materials were pushed up to the base of the hillslope, which elevated the existing access road 2-3 feet and will help keep the road out of the floodplain. The CTUIR paid for this work as part of the cost share on the project, which totaled $1,500.

Seasonal EBA's assisted Weldon Witherite with placement of whole trees and boulders on the Imnaha River. Placement of structures was designed to improve bank stability, divert high flows away from Mr. Witherite's residence, and improve fish habitat by acting as a self-sustaining woody debris jam.

Planting

ODFW personnel collected approximately 3,100 willow and cottonwood cuttings and poles. Cuttings were collected in late winter and conditioned for 4-6 weeks. A 5-ft. stinger for planting cottonwood and willow poles was constructed for $320. It attaches to the backhoe boom on the Kubota tractor, and was used to plant cottonwood poles on Little and McCoy creeks.

In the Wallowa subbasin, 165 pine trees were planted on the Hurricane Creek/Jones property (Table 5). On the Little Creek/Kerr property 300 willow and 90 cottonwood poles were planted. On the Meadow Creek/A. Cunha property 55 dogwood and 750 pine were planted; and on the Upper Grande Ronde River/Crown Pacific property 1,835 rooted ponderosa pine were planted. See also "Operations & Maintenance-Revegetation".

Fencing

Two 10-year cooperative agreement projects were completed in 1998. In the Middle Grande Ronde subbasin 0.25 miles of stream and 2.1 acres of habitat was protected with 0.5 miles of fencing on a tributary to Coon Creek (Table 3). In the Catherine Creek subbasin 0.4 miles of high tensile fence was constructed on the Little Creek/Kerr property. ODFW, GRMWP, ODF and Salmon Corp personnel participated (Appendix 5), enabling completion of the job in only 3 workdays. The fence provided for generous riparian corridors, and protects 0.25 miles of stream and 5 acres of habitat. The landowners will maintain both projects.

In late September Badger Fencing Company was awarded the fence construction job on the Meadow Creek/A. Cunha property. Fence inspections were conducted as the work progressed. Fence anchors on rock bluffs were drilled and installed by ODFW personnel. Approximately 2.1 miles of high tensile fence was completed before wet weather set in and work halted. The remaining 1.7 miles will be completed in 1999, and will protect 1.7 miles of stream and 140 acres of habitat.

In the Wallowa subbasin 6 projects were completed in 1998. ODFW personnel constructed 0.6 miles of high tensile fence and 5 gates on the Hurricane Creek/Irby property, protecting 0.7 miles of stream and 20.3 acres of riparian habitat. Five adjacent properties were fenced on the Wallowa River. ODFW personnel constructed 0.7 miles of high tensile fence and 2 water gaps on south side of the stream on the Wiseman property; and 0.7 miles of fence and one water gap on the opposite side of the stream on the Burrows, Cox, Johnson, and McCrae properties. These projects protect 17.2 acres of riparian habitat. A total 0.7 miles of old fence was removed on the Wiseman property.

In total, nine projects were implementeded in 1998, protecting 3.5 miles of stream and 184.6 acres of instream and riparian habitat. The Grande Ronde Basin Fish Habitat Enhancement Project currently has protected 33.1 miles of stream and 957.4 acres of riparian habitat in the Upper Grande Ronde drainage; 20.9 miles of stream and 388.0 acres in the Joseph Creek subbasin; 3.0 miles of stream and 46.5 acres in the Wallowa subbasin; and 2.8 miles of stream and 27.3 acres in the Camas Creek subbasin (Table 3).

TABLE 3. Grande Ronde River Basin stream and riparian habitat protection projects, 1985-1998.

UPPER GRANDE RONDE:		Year	Stream	Acres	Fence	Water	Cross
Stream	Landowner	Built	Miles	Protected	Miles	Gaps	Fences
Beaver Creek	Clark/Crown Pacific	1993-94	6.0	243.6	11.5	10	22
Coon Ck. Tributary	Warren*	1998	0.25	2.1	0.5	1	2
Fir Creek	Wyland*	1997	0.4	3.0	0.8	1	2
Fly Ck.	Smith	1987	1.2	14.8	1.7	3	7
Little Ck.	Kerr*	1998	0.25	5.0	0.4	2	6
McCoy Ck.	Misener/Tipperman	1988	1.9	84.2	3.35	6	10
Meadow Ck.	Alta Cunha Ranches	1998-99	1.8	140	2.1	N/c	n/c
Meadow Ck.	B.M.C.B.A.	1990	0.4	6.6	1.1	1	2
Meadow Ck.	Misener/Tipperman	1988	2.7	96.2	5.3	4	8
Meadow Ck.	Waite	1989	1.2	19.7	2.6	1	3
Sheep Ck.	BLM	1988	0.7	12.8	0.8	0	1
Sheep Ck.	Vey	1987-88	4.3	54.7	6.0	8	14
U.G.R. River	Bowman/Hoeft	1991	1.5	37.8	3.2	3	8
U.G.R. River	Crown Pacific	1997	5.2	179.7	5.1	1	0
U.G.R. River	Delve	1991	0.5	7.0	0.9	1	3
Whiskey Ck.	Courtney	1991-92	3.3	35.0	5.6	14	30
Whiskey Ck.	Hampton	1990-91	1.5	15.2	3.0	6	15
		Subtotals:	**33.1**	**957.4**	**54.0**	**62**	**133**
JOSEPH CREEK SUBBASIN:		Year	Stream	Acres	Fence	Water	Cross
Stream	Landowner	Built	Miles	Protected	Miles	Gaps	Fences
Butte Ck.	McDaniel	1990-91	2.7	29.7	5.3	9	19
Chesnimnus Ck.	McDaniel	1992	3.8	130.1	8.1	13	29
Chesnimnus Ck.	Yost	1986-87	3.0	41.8	5.6	8	18
Crow Ck.	Buhler	1989	0.8	7.4	1.5	5	11
Crow Ck.	Fleshman	1988	1.2	10.5	2.4	6	11
Elk Ck.	Birkmaier (expired)	1986	0.6	7.7	1.4	5	12
Pine Ck.	McDaniel	1991	1.5	43.5	3.2	4	11
Salmon Ck.	McClaran	1989	0.7	7.0	1.4	3	5
Salmon Ck.	McDaniel	1990	1.6	45.5	3.2	6	14
Swamp Ck.	Boise Cascade	1987	2.6	48.6	5.0	5	12
Swamp Ck.	Olsen (expired)	1985	2.4	16.2	4.4	8	15
		Subtotals:	**20.9**	**388.0**	**41.5**	**72**	**157**
WALLOWA SUBBASIN:		Year	Stream	Acres	Fence	Water	Cross
Stream	Landowner	Built	Miles	Protected	Miles	Gaps	Fences
Hurricane Ck.	Irby	1998	0.7	20.3	0.6	0	2
Hurricane & tribs.	Jones	1997	0.8	9.0	1.3	4	9
Wallowa River	Burrows*	1998	0.06	0.3	0.06	0	0
Wallowa River	Cox	1998	0.4	4.7	0.4	0	0
Wallowa River	Johnson	1998	0.1	1.3	0.1	1	2
Wallowa River	McCrae	1998	0.2	2.8	0.2	0	0
Wallowa River	Wiseman	1998	0.7	8.1	0.7	2	4
		Subtotals:	**3.0**	**46.5**	**3.4**	**7**	**17**

CAMAS CREEK: ***(NFJD basin)***		Year	Stream	Acres	Fence	Water	Cross
Stream	Landowner	Built	Miles	Protected	Miles	Gaps	Fences
Camas Creek	Pendleton Ranches	1995	2.3	27.3	4.1	4	10
	GRAND TOTALS:		**59.2**	**1,418.7**	**103.0**	**144**	**317**

* Indicates a 10-15 year cooperative agreement, landowner does project maintenance.

Offsite Water Developments

Two solar pump and trough systems were successfully installed on the Upper Grande Ronde River/Crown Pacific property. One required considerable effort troubleshooting a malfunctioning pump, but both pump systems eventually worked well throughout the summer. These eliminated the need for 2 watergaps.

Miscellaneous Implementation Activities

Several trailer loads of scrap metal (water tanks, bedsprings, etc.) were removed from the Wallowa River/Johnson property and hauled to the county landfill. These materials had been placed there over the years to help "stabilize" the streambanks, but were preventing reestablishment of new vegetation.

OPERATIONS AND MAINTENANCE:

Landowner Coordination

Various landowners were contacted throughout the year to discuss timing of cattle movements, water gap needs, fence realignments, weed control and protection of riparian plantings.

The technician spoke with Flip Houston of Crown Pacific regarding damages to fences from logging activities along Beaver Creek and the Upper Grande Ronde River. The use of their helicopter's time to install large wood in both streams, and donation of ponderosa pines was also discussed.

The biologist and technician spoke with Ed Jones on Hurricane Creek regarding newborn calves falling under the bottom wire and into the fenced off riparian areas, and then not being able to get back out on their own. We agreed to add another strand of bottom wire and fill in dips with hogwire or soil if the problem continued.

The biologist spoke with Charlie Kissinger regarding some excessive clearing of vegetation along the Hurricane Creek/Irby property, which was a violation of the lease agreement. Apparently an unsupervised contractor he hired got carried away and decided to "reduce fuel loads" on the east side of the stream. The landowner agreed to extensive replanting of the area. Alder Slope Nursery was contacted to initiate the work, which will be done at the landowner's expense.

The technician made arrangements with Vern Bennett to cut junipers that were used to stabilize eroding streambanks in Wallowa county. Mr. Bennett donated the trees in return for thinning and cleanup by ODFW personnel.

Instream Maintenance

An inspection of structures was completed while repairing fences and water gaps. Most structures were functioning within specifications and no maintenance needed.

In the Joseph Creek subbasin work continued on repairing damages from the 1997 floods using FEMA funds. A private landowner in Wallowa donated whole juniper trees that were used for the repairs. A total of 305 trees were transported to 21 job sites on Butte, Crow, Chesnimnus and Pine creeks. The trees were used to construct juniper riprap and protect 1,497 feet of streambank on 4 streams (see Table below). The Kubota tractor was used to load and move materials. FEMA funds totaling $19,413 in labor and materials were used to complete all of the work.

TABLE 4. Streambank stabilization conducted in Joseph Creek subbasin streams, 1998.

Stream	No. Sites	No. Trees	Ft. Treated
Butte Ck.	3	17	108
Chesnimnus Ck.	12	248	1,033
Crow Ck.	5	17	212
Pine Ck.	1	23	144
Totals:	**21**	**305**	**1,497**

Revegetation

Table 5 summarizes revegetation and new project planting activities undertaken in 1998. Selection of revegetation sites was based on the need to improve bank stability, accelerate shade recovery, or to provide future large woody debris. A total of 6,385 trees and shrubs were planted to revegetate several streams where recovery did not occur as anticipated; and 3,195 were planted on new projects, for a grand total of 9,580. Disturbed areas were reseeded with 170 lbs. of riparian, upland or road seed mixes. Maps of planting sites were completed to aid with future monitoring of plant survival.

TABLE 5. Riparian Plantings in Grande Ronde Basin streams, 1998.

		PLANT SPECIES						
LOCATION	**LANDOWNER**	Willow cuttings	Willow Poles	Cottonwood poles	Dogwood	Ponderosa Pine	Sumac	**Site Totals:**
Beaver Cr.	Crown Pacific					400		400
Camas Cr.	Pendleton Rch	750			50			800
Ches. Cr.	Yost	300	100					400
Crow Cr.	Buhler	500				120		620
Hurricane Cr.	Jones					165		165
Little Cr.	Kerr	300		90				390
McCoy Cr.	Tipperman			110		800		910
Meadow Cr	A. Cunha				55	750		805
Pine Creek	McDaniel	300	50			70		420
Salmon Cr.	McDaniel					70		70
Salmon Cr.	McClaran					210		210
Sheep Cr.	Vey/BLM					400		400
U.G.R.R.	B/H					220		220
U.G.R.R.	Crown Pacific					1835		1,835
Whiskey Cr.	Courtney	500				400		900
Whiskey Cr.	Hampton	550		25	20	400	40	1,035
Species	**Totals:**	**3,200**	**150**	**225**	**125**	**5,840**	**40**	**9,580**

Note: 135 lbs. of seed mix was applied to disturbed soil after leveling of the old railroad grade on the Meadow Cr/A.Cunha property; 5 lbs. applied to eroding banks on Whiskey Creek; 5 lbs. around spring development sites on the Upper Grande Ronde River; and 25 lbs. to juniper cutting sites.

Fence Maintenance

Inspections of a total of 92.7 miles of project fence were completed: 50.2 miles in the Upper Grande Ronde River drainage; 37.1 miles in the Joseph Creek subbasin; 1.3 miles in the Wallowa subbasin; and 4.1 miles in the Camas Creek drainage. A total of 292 stream cross fences and associated watering gaps were inspected and maintained in the spring and fall.

Maintenance of stream cross fences included removal of these structures in the fall to prevent damage from icing and high flows, and reinstallation and repair in the spring after flows subsided. Maintenance of water gaps consisted of ensuring that all entry gates, escape gates and fence structures were functioning properly. Routine maintenance of the main fence lines included removing fallen trees, repairing and tightening wires, and repairing structures. Aerial surveys were conducted to help quickly identify cattle trespass problems throughout the project area. Fish habitat personnel regularly patrolled all projects during the hot summer months and kept cattle trespass problems to a minimum.

No significant flooding occurred this year, so maintenance was minimal this year. Project personnel converted several water gaps to electric fences where appropriate. Projects that required significant amounts of labor and materials in 1998 included:

Upper Grande Ronde subbasin

Fence inspections and maintenance were completed on Beaver Creek, and all other Upper Grande Ronde streams. Blown down trees (33) were again a major problem on Beaver Creek.

Water gaps on Whiskey Creek required strengthening since cattle were no longer respecting the lower portions of the water gap cross fences. These had been made up of hogwire panels attached to cables, and weighted down with rock ties. To solve the problem T-133 posts were securely driven into the streambed and panels wired to them to prevent cattle from walking through them or lifting them up. Several broken wires were repaired and 10 blown down trees removed from fences.

Joseph Creek and Wallowa subbasins

Water gaps were installed on all Joseph Creek subbasin projects, but were blown out by heavy spring rains the first week of June. Several structures had to be replaced on Chesnimnus Creek.

A gate was constructed and an extra bottom barbless wire was added to the fence on the Hurricane Creek/Jones property to prevent calves from entering the riparian side. Pit run rock was also added to the water gaps to reduce siltation and erosion. Approximately 100 feet of old fence was removed from the Hurricane Creek/Jones property.

Camas Creek Drainage

No major flooding or fence maintenance problems occurred.

Miscellaneous Operations & Maintenance Activities

Wendy Rosa of ODFW and Dan Sharratt of the Oregon Dept. of Agriculture inspected the Meadow Creek/A. Cunha property for noxious weeds. Leafy spurge, Canadian and Bull thistle were observed. Insects were collected and dispersed on the property to control the leafy spurge.

The technician spoke with Doug McDaniel and Paul Yost regarding weed control on their respective properties since the Wallowa County Weed Control would not be able to conduct the work. Both landowners agreed to spray their own properties and bill us for labor and chemicals. Weed control was completed on the McDaniel properties (Butte, Pine and Chesnimnus creeks) by the landowner for the cost of $870.00. Paul Yost did a minimal amount of spraying at no charge. The spraying was done to eliminate the primary noxious weeds as identified by the Oregon Department of Agriculture.

Routine maintenance was completed on pickup trucks, ATV's, and the Shaver post driver. Hilti drills and chain saws were tuned up or sent in for repairs. Repairs were made to trailer brakes and wiring, and wheel-bearing seals were replaced. The old storage shed was moved to a new location, and a new 12'x 22' shed was installed. The materials stockpile was inventoried as needed.

MONITORING AND EVALUATION:

Photopoint Establishment

In the Upper Grande Ronde drainage 11 photopoints were established on the Meadow Creek/A. Cunha Ranches project. Several photographs were also taken of the railroad grade removal. Five additional photopoints were established on the Upper Grande Ronde River/Crown Pacific project.

In the Wallowa subbasin photopoints on the Hurricane Creek/Irby property were permanently marked. A total of 12 photopoints were established on Wallowa River projects: 1 on the Burrows property; 2 on Cox's; 1 on Johnson's; 3 on McCrae's; and 5 on the Wiseman property.

Photopoint Picture Taking

190 photopoints of a total of 255 were retaken in 1998. All photopoint pictures were processed, labeled, and filed in permanent notebooks.

Habitat Monitoring Transect Establishment and Data Summarization

In the Upper Grande Ronde drainage 40 habitat monitoring transects were established on Sheep Creek and 40 on McCoy Creek in 1988. In the Joseph Creek drainage 30 transects were established on Elk Creek and 30 on Chesnimnus Creek in 1988. All data sets from the original measurements were entered into a summarization program on Dbase III Plus in 1993.

Thermograph Data Collection and Summarization

Hourly temperature data have been recorded, collected, summarized and graphed from thermographs in Sheep and McCoy creeks since 1988; from Salmon Creek since 1991; and Beaver and Camas creeks beginning in 1994. All of these permanent thermographs functioned normally this year, with the exception of Lower Salmon creek, which recorded sporadic negative temperatures, and Upper Beaver Creek recorded air temperatures for a brief period in July. A total of 10 sites were monitored in 1998, using 6 Ryan Tempmentors and 4 Unidata Starloggers thermographs. Winter temperature data was summarized and graphed but not included in this report.

A macro for calculating the 7-day moving average of daily maximum temperatures was created in Quattro Pro. This method is currently used by ODEQ to determine water quality limited streams. The old Quattro Pro for DOS version of the Ryan Tempmentor summarization program was reprogrammed to run on the newer Quattro Pro 7.0 for windows version. Program files and instruction manuals were distributed to the other fish habitat biologists.

Thermograph Data Analysis

It is important to keep in mind temperature tolerances of salmonids as we analyze the data. The upper lethal limit for chinook salmon has been reported as 26.2^{o}C, and the lower lethal limit at 0.8^{o}C. Upper and lower lethal limits for steelhead are 23.9^{o}C and 0.0^{o}C (Meehan, 1991). The Independent Scientific Group (ISG, 1996) also reviewed available information and concluded that the thermal requirements for chinook salmon are approximately as follows:

LIFE STAGE	TEMPERATURE			
	Optimum	Range	Stressful	Lethal*
Adult migration and spawning	50 °F (10 °C)	46.4 -55.4 °F (8 –13 °C)	>60 °F (>15.6 °C)	>70 °F (>21 °C)
Incubation	<50 °F (<10 °C)	46.4 -53.6 °F (8-12 °C)	>56 °F (>13.3 °C)	>60 °F (>15.6 °C)
Juvenile rearing	59 °F (15 °C)	53.6-62.6 °F (12-17 °C)	>65 °F (>18.3 °C)	>77 °F (>25 °C)

** Lethal is for 1-week exposures, higher temperatures may be tolerated for shorter exposure times.*

They also concluded that other salmonid species are not markedly different. Salmonid populations are able to respond to temperature changes by moving upstream or downstream to find thermal refuges. Warming of streams, however, may concentrate salmonids into small areas where they may be more susceptible to predation (Appendix 3), or lead to invasion of non-native species (Ebersole, et.al., 1994). In 1996 the Oregon Department of Environmental Quality (ODEQ), in accordance with an Environmental Protection Agency mandate, listed water quality limited streams in the state. The "303(d)" list included guidelines for stream temperatures; streams whose 7-day average of the daily maximum temperatures exceeded 17.8° Celsius (64° Fahrenheit) were listed as being thermally polluted, and are considered to have sub-lethal temperatures for salmonids and other cold-water species.

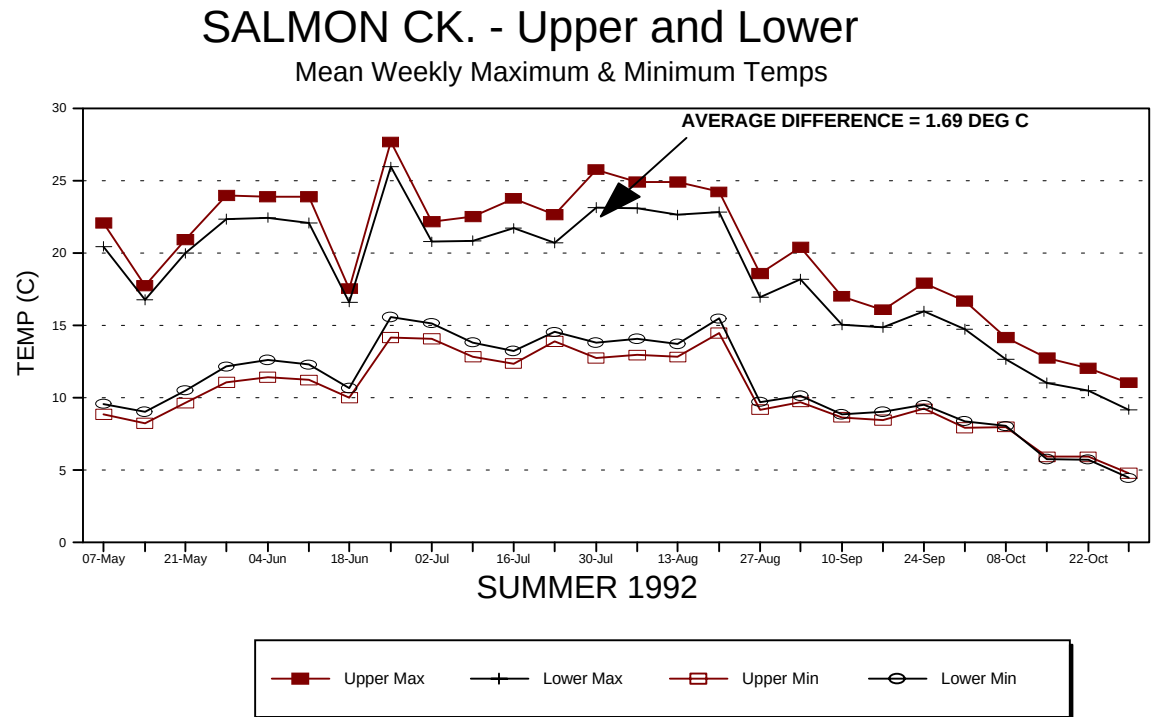
Analysis of summer stream temperature data by site are summarized below:

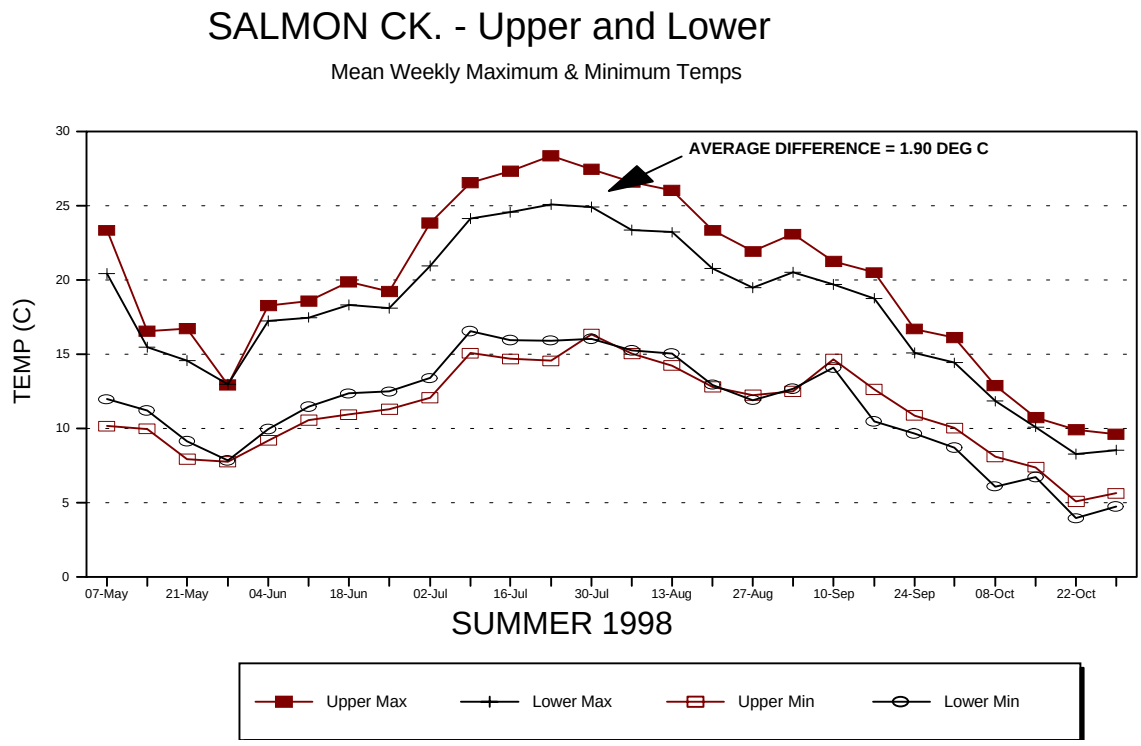
Salmon Creek:

Thermographs were installed at two sites in 1991. The upper site is located at the upstream end of the McDaniel property at RM 2.4. The lower site is near the mouth at RM 0.1, on the McClaran property. Riparian fencing at the upper site was completed in 1990; the lower site was fenced in 1989.

Salmon Creek has consistently shown cooling of stream temperatures as water travels downstream through the riparian corridor. In 1992, comparison of upper and lower summer mean weekly maximum temperatures showed an average cooling of 1.69°C at the lower (downstream) thermograph (Figure 3). In the summer of 1998 the average was 1.90°C cooler at the lower end. Salmon Creek is a small mid-elevation stream, and despite some recent heavy flooding, the vegetation is now in better condition to prevent damage from high flows, and there has been a considerable increase in the amount of shade along this reach. The stream channel has narrowed and deepened, reducing the stream surface area and amount of solar radiation reaching the creek. There are also inputs of ground water from some springs that were also fenced off in 1990 and are also becoming more shaded.

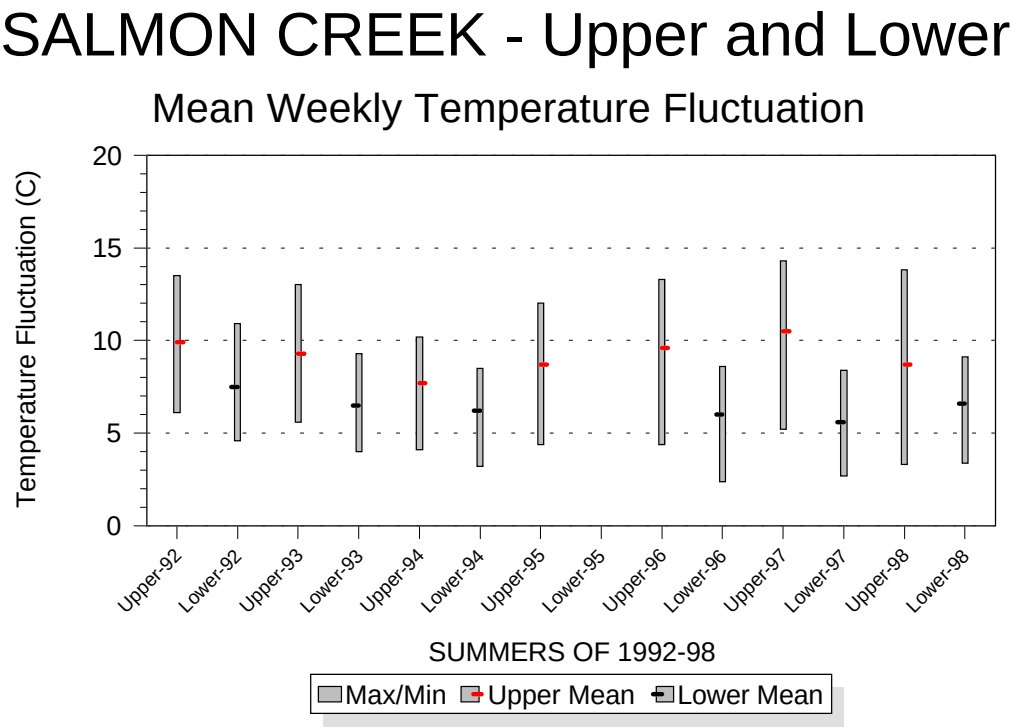
Figure 3. Summer temperature data on Salmon Creek 1992 and 1998, at RM 2.4 (Upper) and RM 0.1 (Lower).





Summer mean weekly temperature fluctuations (measured as the difference between the mean weekly maximum and mean weekly minimum temperatures) for 1992 through 1998 show that temperatures are more stable at the lower thermograph in all years monitored (Figure 4).

Figure 4.



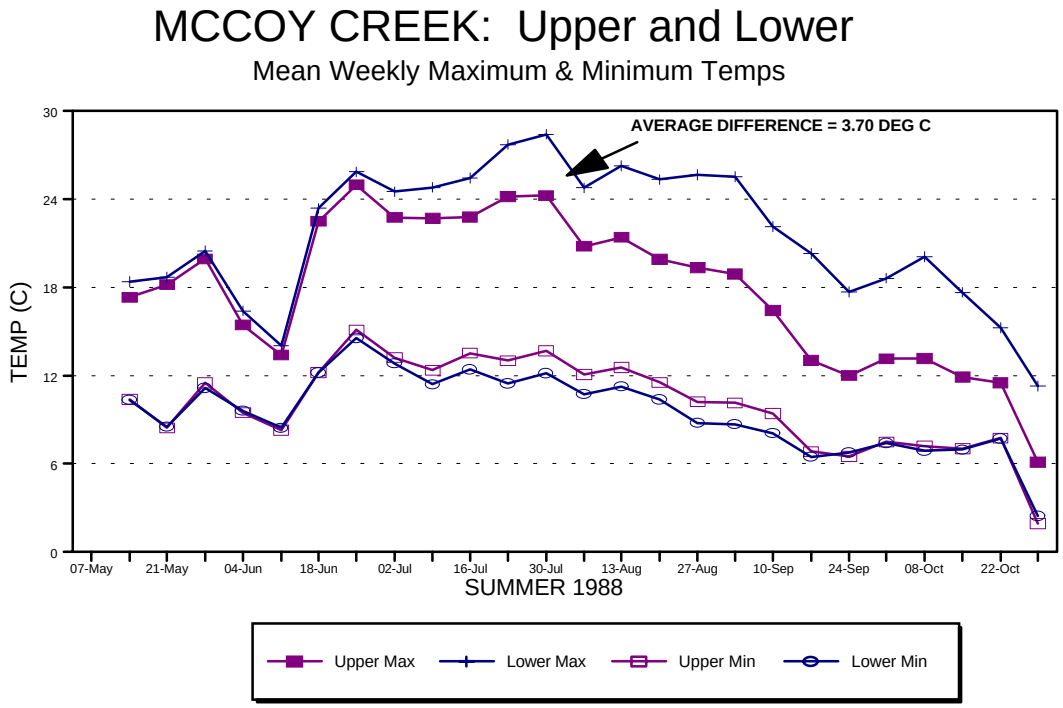
Incomplete data for Lower-95

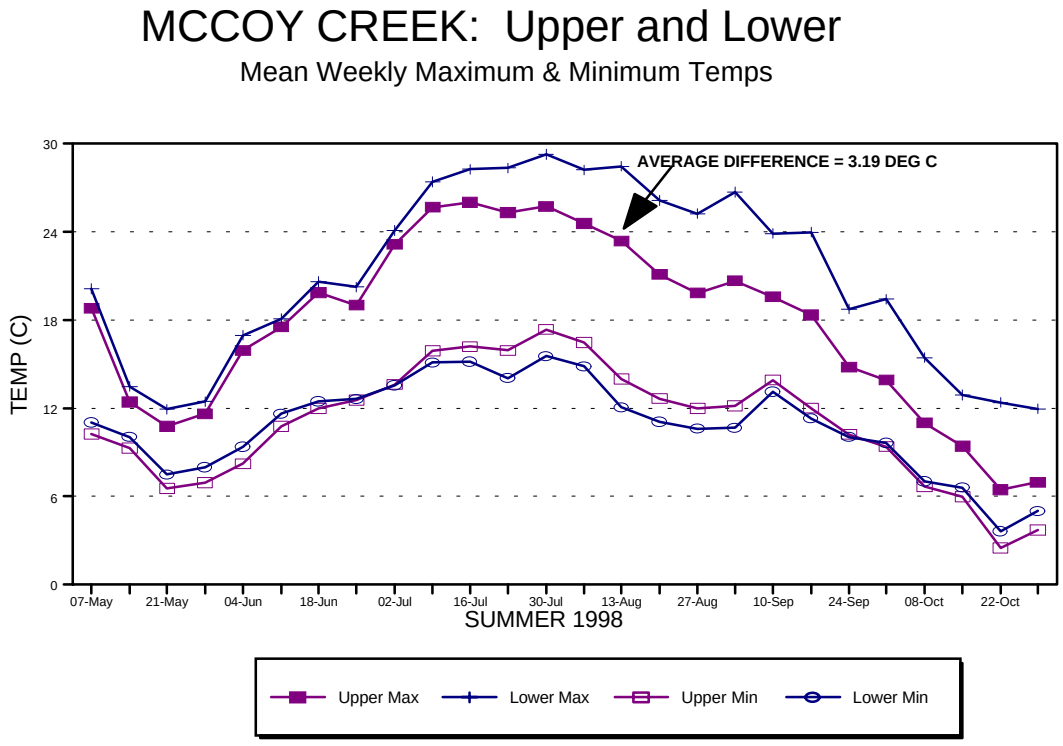
McCoy Creek:

Two thermographs were installed in 1988 on the Tipperman property; riparian fencing was constructed in the same year. The lower site is located near the mouth of McCoy Creek, and the upper site is about 1.6 miles upstream, at the start of a canyon. In 1997 the McCoy Meadows channel relocation project was implemented in the upper meadow (RM 0.8 to RM 1.5), which diverted the existing channel into one of the pre-1970 channels.

In 1988, the first year of data collection, summer mean weekly maximum temperatures at the lower (downstream) site averaged 3.70^{o}C warmer than the upper site (Figure 5). In 1998 the average difference was 3.19^{o}C, indicating that the amount of warming has decreased slightly, but not any more so than reported in past years. In 1997 we reported cooling of temperatures in the reactivated (pre-1970) channel, but the stream continues to heat up rather quickly as indicated by the temperatures at the lower site.

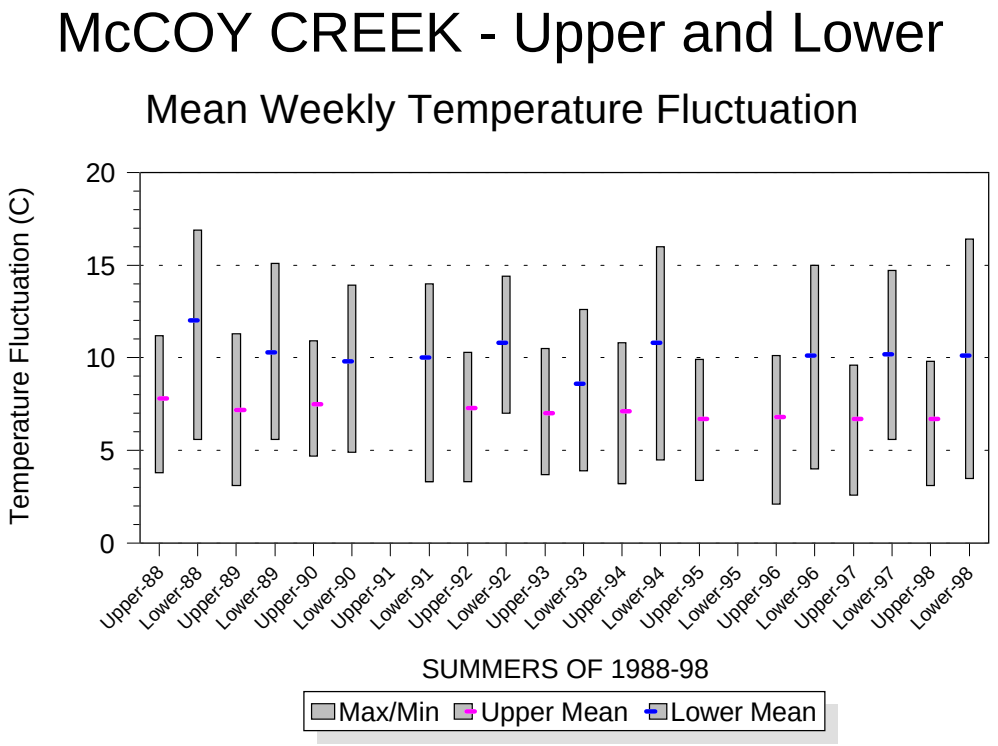
Figure 5. Summer temperature data on McCoy Creek in 1988 and 1998, at RM 1.6 (Upper) and RM 0.0 (Lower).





Average summer mean temperature fluctuations at the upper and lower sites during 1988-1998 (Figure 6) show that the upper site has remained relatively stable with means ranging from 6.7°C to 7.8°C. Mean fluctuations at the lower site were greater in all years, ranging from 8.6°C to 12.0°C, indicating the thermal refugia at the lower site remains less suitable for salmonids in the summer.

Figure 6



Incomplete data for Upper-91, Lower-95

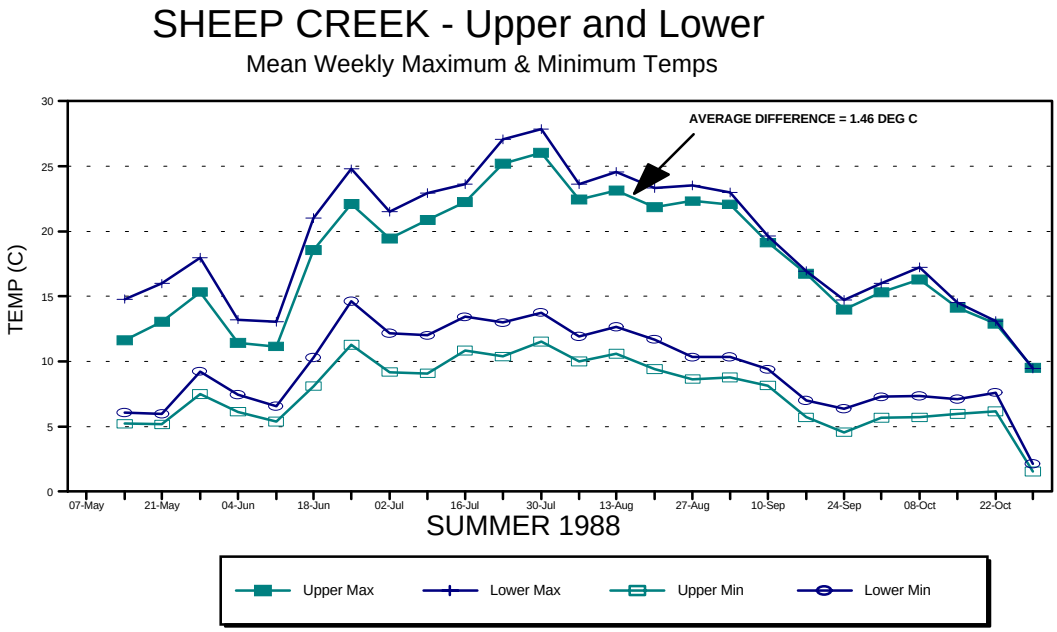
The removal of riparian vegetation surrounding low order streams can increase summer diurnal fluctuations (Brown and Krygier, 1970). This stream was channelized in the 1960's and 1970's, an undersized culvert bridge restricts and diverts high flows, and the stream was heavily grazed until 1988. Stream sinuosity in the lower meadow remains <1.1. Vegetative recovery in this reach has occurred at a slow, steady pace, but is still not at full potential. However, the rate of recovery should accelerate once problems with channel configuration and poor floodplain function are addressed.

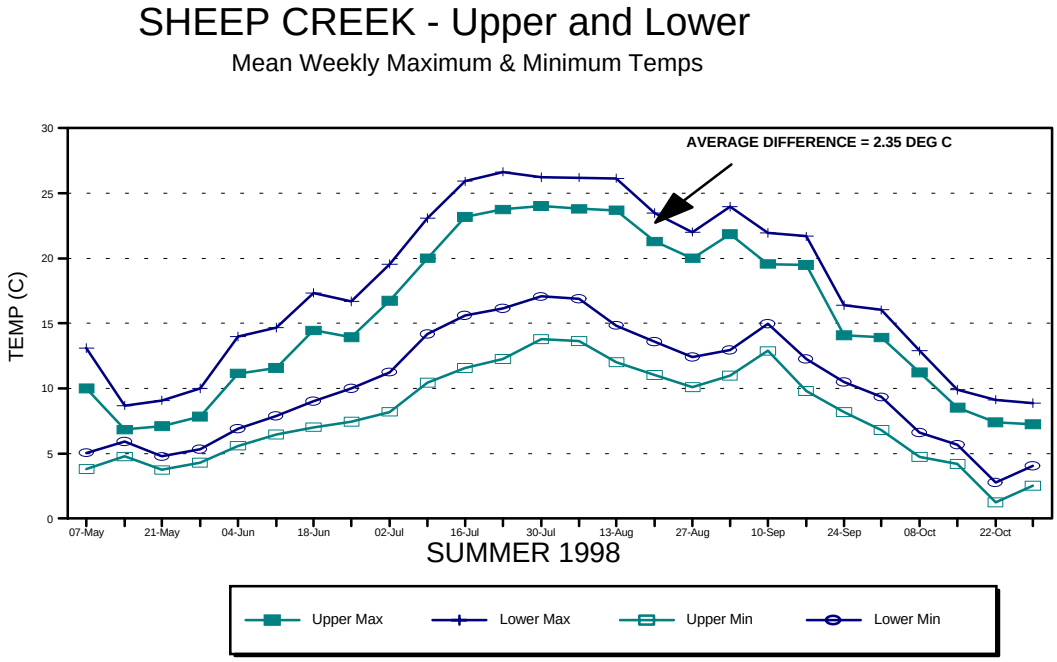
Sheep Creek:

Thermographs were installed in 1988 on the Vey property and fencing was completed the same year. The upper site is located at RM 6.7 near the U.S. Forest property boundary. The lower site is located 4.3 miles downstream at RM 2.4 and about 100 feet upstream from the bridge along F.S. Road 51.

Comparison of summer mean weekly maximum temperatures shows that lower Sheep Creek averaged 1.46°C warmer than the upper site in 1988; and 2.35 °C warmer in 1998 (Figure 7). Mean summer maximum stream temperatures continue to show moderate and consistent warming of 1 to 3°C at the lower thermograph.

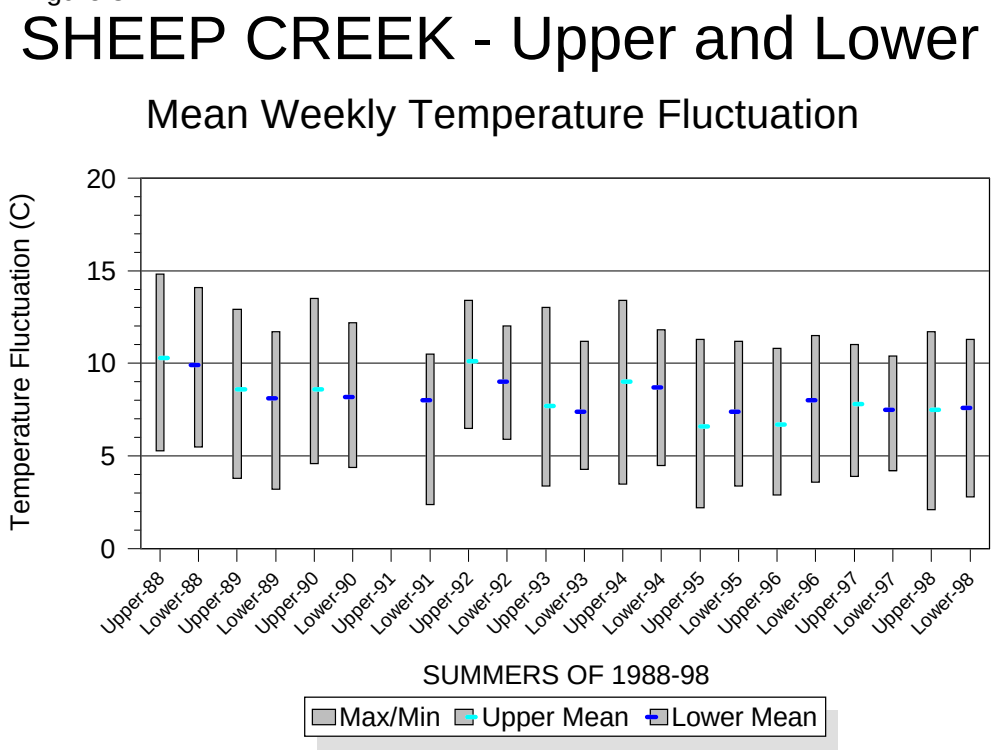
Figure 7. Summer temperatures on Sheep Creek in 1988 and 1998, at RM 6.7 (Upper) and RM 2.4 (Lower).





Average summer mean weekly temperature fluctuations for 1988-94 showed that lower Sheep Creek fluctuated less than the upper site in those years. The trend reversed in 1995 and 1996 (Figure 8), reverted back to the former pattern in 1997, and showed no consistent pattern by flip-flopping again in 1998. Despite the 10 years rest from grazing, shade in this reach is still poor, and woody species are very slow in recovering.

Figure 8.



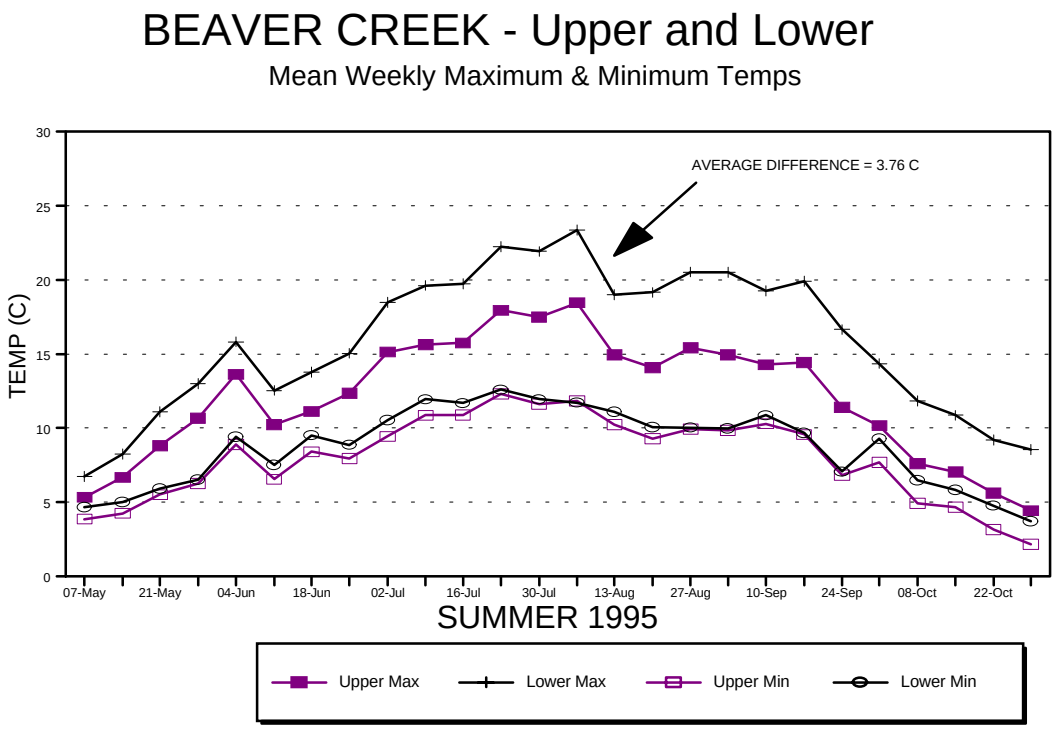
Incomplete data for Upper-91

Beaver Creek:

ODFW installed Hobo Temp thermographs at the mouth of Beaver Creek, and at the Crown-Pacific/ U.S. Forest Service property boundary at RM 5.9 in July 1994. These were replaced in November 1994 with Unidata Starlogger thermographs that also recorded ambient air temperature. Riparian fencing was completed on the lower half of the study area in 1993, and on the upper half in 1994.

Comparison of Beaver Creek mean weekly maximum water temperatures in 1998 showed reduced amount of warming of water moving downstream compared to 1995 (Figure 9), with temperatures at the lower site averaging 3.0^{o}C warmer. Mean weekly air temperatures at each site, however, do not show such a large difference between the upper and lower sites, suggesting that solar radiation and/or other heat sources, rather than air temperature alone is heating this reach (Figure 10). Stream temperatures at the Upper Beaver Creek site are one of the few places we have monitored that generally do not exceed ODEQ water quality standards. A large portion of the upper drainage is within the protected La Grande City Watershed.

Figure 9. Summer temperature data on Beaver Creek in 1995 and 1998, at RM 5.9 (Upper) and RM 0.0 (Lower).



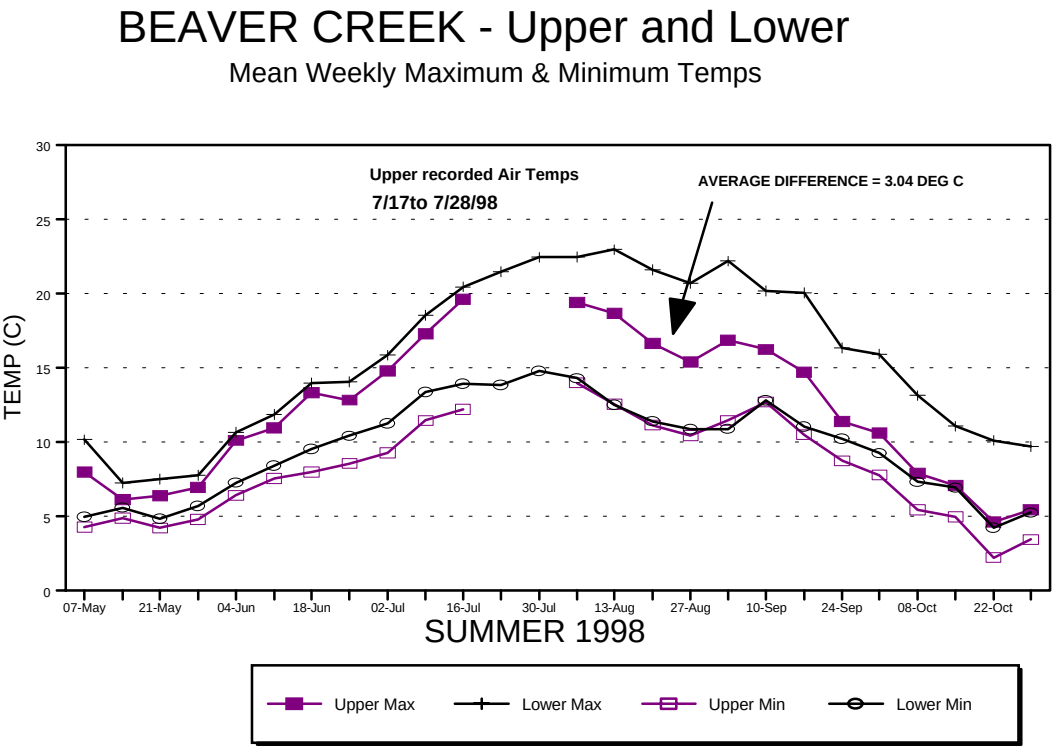
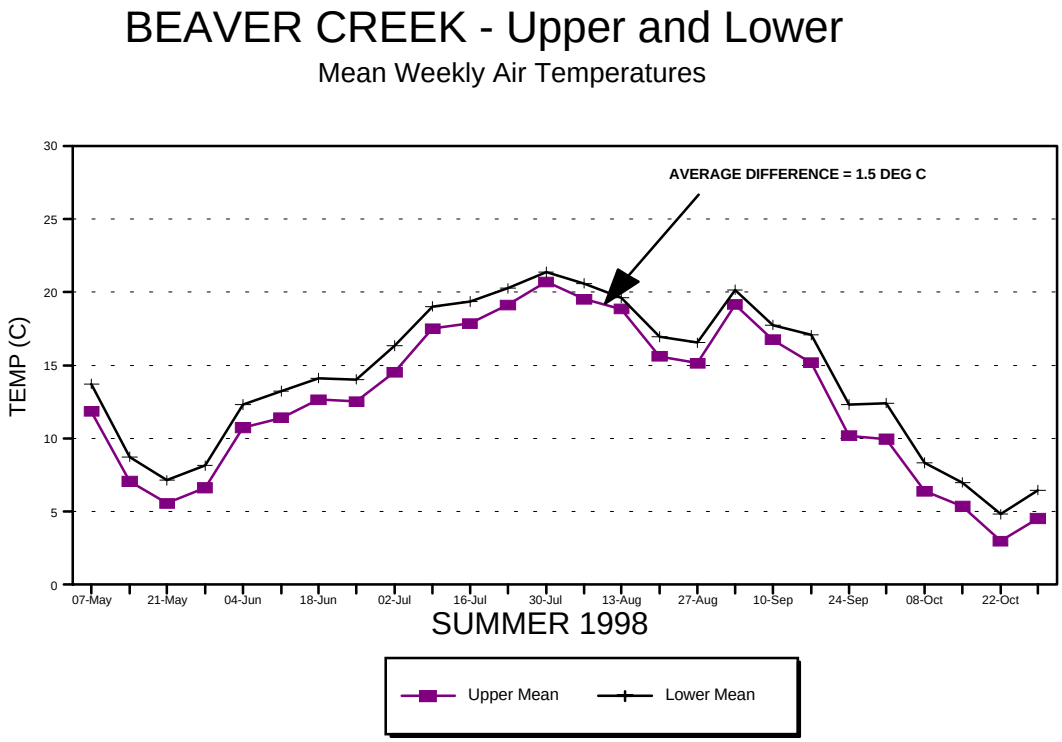
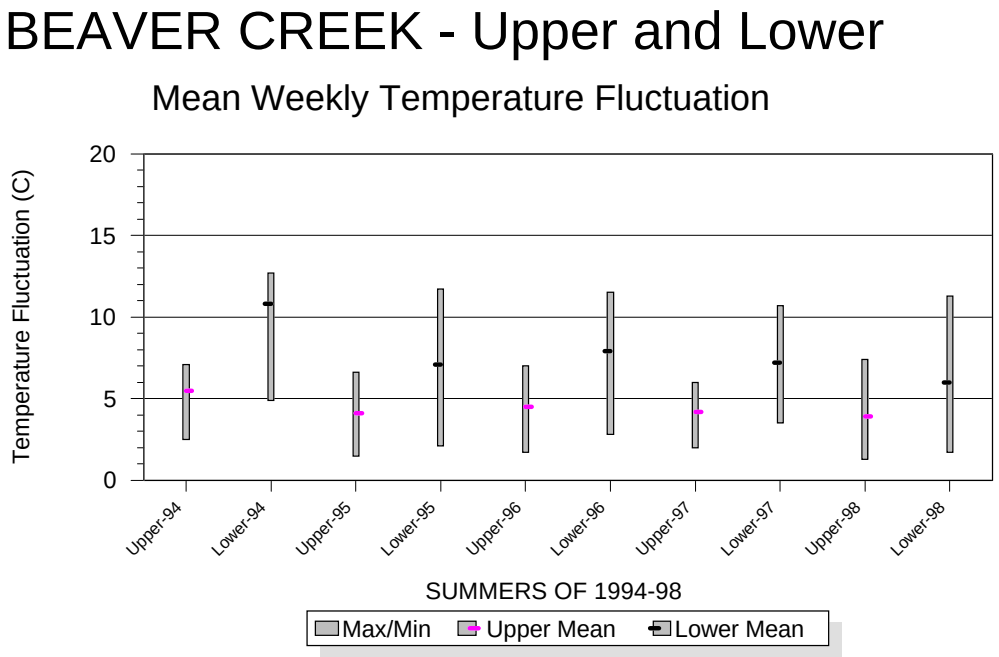


Figure 10. Air temperatures on Beaver Creek in 1998.



Average mean weekly temperature fluctuations at the upper Beaver Creek site were much lower in all five years compared to the lower site (Figure 11).

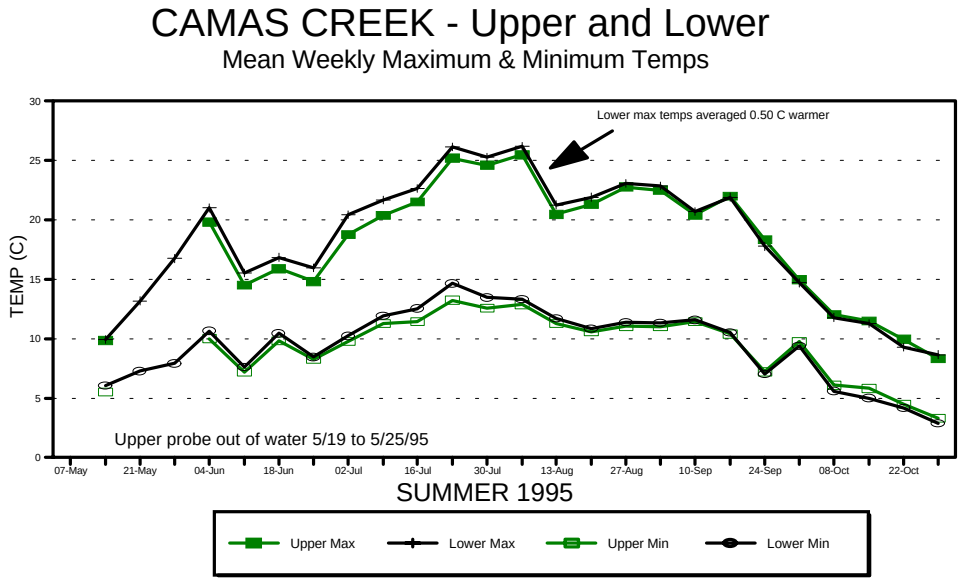
Figure 11.

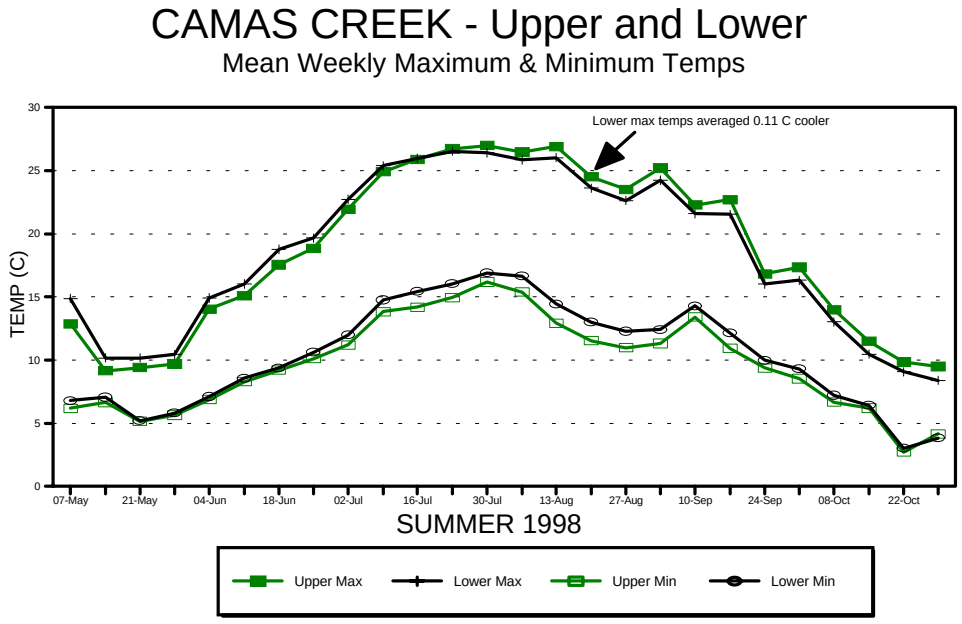


Camas Creek:

Permanent Unidata Starlogger thermographs were placed at the upper and lower ends of the project area in May of 1995, recording stream and ambient air temperatures. Riparian corridor fencing was completed in 1995. The upper site is located about 0.3 miles downstream of Lehman Hot Springs Road at RM 29.6; the lower site is about 2.8 miles farther downstream at RM 26.8 at the Pendleton Ranches/Forest Service property boundary. Comparison of summer mean weekly maximum temperatures shows that lower Camas Creek averaged 0.5°C warmer than the upper site in 1995; but was 0.11°C cooler in 1998 (Figure 12). We hope this trend will continue.

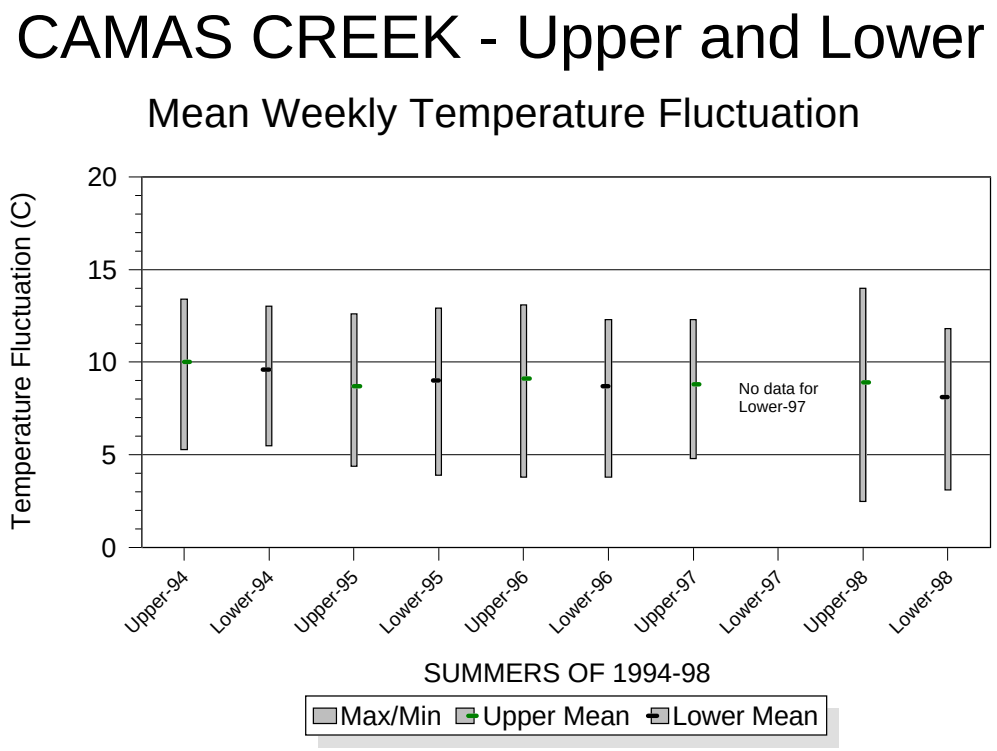
Figure 12. Summer temperature data on Camas Creek in 1995 and 1998, at RM 29.6 (Upper) and RM 26.8 (Lower).





Average summer mean weekly temperature fluctuations for 1994-98 showed that fluctuations are very similar at both sites, ranging from 8.1 to 10.0°C (Figure 13).

Figure 13.



Miscellaneous Monitoring & Evaluation Activities

A steelhead spawning ground survey was conducted May 11, 1998 on 3.6 miles of Whiskey Creek and 1.0 miles of Little Whiskey creeks. One live fish and 1 redd was found in Little Whiskey Creek. Four live fish and 9 redds were found in main Whiskey Creek. No hatchery fish were observed. The creek appears to be showing a slow, but steady improvement in redd counts over the five years monitored (Table 6). Although counts were down slightly from last year, this was also the first year that any fish or redds were found upstream of the forks of these two streams.

Spawning steelhead were noted in Hurricane Creek within the leased Irby property on April 15th. Surveys were not conducted on this stream. The biologist assisted La Grande district fisheries staff with a steelhead survey on 5 miles of Five Points Creek on June 5th, 1998. Fifteen redds were observed.

TABLE 6. Steelhead redd counts on Whiskey and Little Whiskey Creeks, 1993 to 1998.

	YEAR					
	1993	1994	1995	1996	1997	1998
# Redds	5	7	7	11	11	10
Live Fish	2	2	3	5	9	5

The instream work completed in 1997 on the McCoy Creek channel relocation project was reviewed once flows receded. For the most part, all structures seemed to be functioning as planned, except for some slight erosion at the upper diversion structure.

Electroshocking stations were resampled in McCoy Creek on June 29, 1998. Fish populations of all species were generally down from last year, with Rb/St counts dropping from 2,286 fish /mile to 675 fish/mile (Appendix 4).

Three additional willow clumps were caged off at the upper end of Sheep Creek, for a total of 17 sites. The exclosures were designed to exclude wildlife (primarily elk and beaver) that may be damaging existing willow groves. Photopoint pictures of older caged areas were retaken, and willow and lodgepole growth measured. Willow change in height of willow clumps averaged 11.4 cm in 1996, 21.8 cm in 1997, and –7.9 cm in 1998. The 1997 growth was similar to that observed within elk exclosures on Meadow Creek where mean height of combined willow species was 25 cm and 22 cm for the 1991-92 and 1992-93 seasons (Case and Kauffman, 1996). Reduction in height of willow clumps in 1998 may be due to browsing by deer or elk since many plants now exceed the 52-inch cage height, or from beaver activity, but could not be positively determined. Cage height will be increased in 1999 to reduce the chance of browsing. Growth of willows within cages generally appeared to be better than surrounding uncaged plants that showed more signs of browsing, but no control areas are established to verify this. Willows forming catkins were also observed for the first time on plants within exclosures. Lodgepole pine growth averaged 21.8 cm in 1996, 17.3 cm in 1997, and 40.6 cm in 1998.

Fish habitat personnel and ODFW Aquatic Inventory Project personnel conducted physical habitat surveys on the McCoy Creek/Tipperman property. Approximately 1.5 miles of stream were surveyed. This was done as part of the monitoring requirements after the channel in the upper meadow was relocated in 1997.

On July 30, 1998 the biologist and La Grande Assistant District Fisheries Biologist snorkeled the Grande Ronde River on the USFS and Stone properties (RM 173). Only six Rb/St were observed, and the vast majority of fish were found in close proximity to wood. Temperatures were probably too high to support salmonids in the main channel at this time of year, but some cold seeps of water from off-channel areas appeared to have great potential for summer rearing habitat.

Pre-project inventories of streambank stability, overhanging vegetation and undercut banks were monitored on 1.8 miles of the Meadow Creek/A. Cunha project using EPA protocol (EPA, 1993). Only 70.6% of the banks were classified as covered and stable (Table 7). The standard used by the Wallowa-Whitman National Forest is >80% stable banks.

TABLE 7. Streambank stability, overhanging vegetation, and undercut banks on Meadow Creek, 1998.

Classification	**Length (ft.)**	**Percent**
Covered and Stable	13,144	70.59%
Covered and Unstable	1,308	7.02%
Uncovered and Stable	2,232	11.99%
Uncovered & Unstable	1,937	10.40%
TOTALS:	18,621	100.00%
Overhanging Vegetation	394	2.12%
Undercut Banks	833	4.47%

Two hundred and fourteen bird boxes were inventoried on McCoy and Meadow creeks by the landowner. Overall utilization was 61.1%, with house wrens again making up the largest percentage at 21.7%. Other species included blue bird, tree swallow, and chickadee.

RESULTS AND DISCUSSION: PROGRAM ADMINISTRATION

Administrative activities during 1998 included preparation of reports and data summaries, budget preparation and purchasing, program development, and personnel hiring and supervision.

Reports and Data Summaries

Quarterly and annual progress reports for the Grande Ronde Basin Fish Habitat Enhancement program were prepared and submitted to BPA. Fish population estimates in McCoy Creek were summarized and reported in Appendix 4.

Project implementation, maintenance and monitoring summaries by subbasin and stream were completed and entered into the program database.

Budgets/Purchases

Considerable time was spent obtaining quotes for construction materials, purchasing supplies, receiving material shipments, working on the Statement of Work and Budget, and tracking project expenditures from four different sources of funds (BPA, FEMA 1997, Grande Ronde Model Watershed Program, and ODFW Fish Restoration & Enhancement). The biologist created a spreadsheet for entering monthly expenses to assist in budget tracking.

The 1998-99 (for FY 1998) Statement of Work and Budget including $12,456 in carryover was submitted and approved by BPA. The 1999-2000 (FY 1999) Workstatement and budget was completed in December. However, the budget could not be approved by BPA until a decision was reached on dealing with the sudden increase in administrative overhead from 22.9% to 35.5%. An increase of this magnitude could result in a loss of $28,000 available to the program (or about 10.8% of the total budget).

Tracking of FEMA funds continued. Labor and materials for instream maintenance in Joseph Creek subbasin streams totaling $19,413 were reimbursed with 1997 FEMA funds. Approximately 53 % of the available FEMA funds were used at the end of this calendar year. A request to extend the FEMA funds to November 30, 1999 was submitted and granted.

The biologist submitted a project proposal to the Grande Ronde Model Watershed Program for the Meadow Creek/A. Cunha Ranches project. Lyle Kuchenbecker of the GRMWP toured the project prior to review by the technical committee. The project was ranked #1 by the committee and was approved for funding in the amount of $37,296. NRCS, CTUIR, and the landowner will provide additional cost shares amounting to $25,530.

Purchases this year included: a new computer, monitor and software, a chain saw, 2 solar pumps, a 12’ x 22’ storage shed, fence materials and field supplies.

Program Development

A third revision of the FY 1998 project proposal, along with responses to comments and questions from CBFWA’s Watershed Technical Work Group was submitted by the biologist in

January. The project was partially approved for funding. Funding for new implementation totaling $40,000 was eliminated, and instead we were instructed to acquire additional funds from the Grande Ronde Model Watershed Program.

Project proposals for FY 1999 were also submitted in January. The proposal was revised and resubmitted again in March, along with comments and answers to questions of the Watershed Technical Work Group. The project proposal was approved, but once again $20,000 of new implementation was cut from the budget. Comments of individual proposals by the Independent Scientific Review Panel (ISRP) were also completed. Our proposal passed their review process, and was categorized as "adequate after revisions."

A draft FY 2000 budget was prepared and submitted to the Program Leader, along with other information necessary for the FY 2000 project proposal. The program leader submitted the FY 2000 project proposals to BPA in December.

Personnel

Requests to hire were completed for seasonal employees. Scott Stennfeld was rehired as a seasonal Experimental Biology Aide in January and worked all year. Dirk Weaver was rehired as a seasonal EBA from September to December. Ray Guse was hired as a new seasonal EBA from April to December. Wayne Baldwin was rehired for three weeks to assist with instream work in November and December. The biologist completed performance evaluations, work plans and position description updates for the technician and EBA's.

Tim Bailey of Pendleton was temporarily assigned Fish Habitat Program Leader duties, and toured the project in July.

Russ Powell was temporarily transferred to the Baker District Office to assist the wildlife program. Scott Stennfeld will take over his duties in the interim.

Contract Administration

Project specifications and an engineer Work Order form were submitted to ODFW Engineering for construction of 3.8 miles of high tensile fence along 1.7 miles of Meadow Creek. Advertisements were placed in newspapers, local fence builders were contacted, and a pre-bid tour was conducted on September 3, 1998. The bid was awarded to Badger Fencing for a total of $30,781. Grande Ronde Model Watershed (BPA) funds are being used to complete the work.

Miscellaneous

Data and programs were transferred from the old computer to the new one. The biologist and technician attended an ODFW purchasing training workshop. Project personnel attended CPR/1st Aide training. Phil Havens of BPA toured old and new projects in August.

INTERAGENCY COORDINATION & EDUCATION

INTERAGENCY COORDINATION:

Grande Ronde Fish Habitat personnel assisted ODFW fish districts, other agencies, groups and individuals with a variety of tasks. Work included helping La Grande, Enterprise, John Day and Pendleton district fisheries biologists with: implementation of ODFW Restoration and Enhancement Program riparian fencing projects; steelhead redd counts on Five Points Creek; assisting the Umatilla fish habitat program with cabling logs on bioengineering projects; and technical reviews of GRMWP project proposals.

Meetings were attended to provide technical input on:

- Implementation plans for work on the McCoy Meadows Restoration project. Several meetings were held to discuss planning for Phase II of the project. Construction sequence, channel design and location in the lower meadow were reviewed.

- A potential Wetland Reserve Program project near the mouth of Marley Creek was reviewed with NRCS, Union SWCD personnel and Marcus Carpenter. Included in the project was removal of sections of an old railroad grade, and rerouting Marley Creek into its historic channel.

- Relocating part of Ladd Creek into a historic channel.

Information, materials or assistance was provided to members of various agencies or individuals, including:

- Stream temperature data, physical habitat surveys, fish population estimates, or spawning surveys were distributed to ODEQ, CTUIR, ODF, Oregon State University, U.S. Forest Service; Union and Wallowa Soil & Water Conservation Districts, Eastside Ecosystem Management group, the Grande Ronde Model Watershed Program, and others.

- Copies of high tensile and barbed wire fence specifications, leases and landowner cooperative agreements were distributed to various individuals and agencies.

- Technical input and on the ground assistance of additions of large woody material in Rock and Whiskey creeks was provided to Rick Wagner of ODF.

- Aerial photographs were loaned to Matt Mahrt and Boone Kaufmann of Oregon State University and the biologist provided assistance in obtaining permission from landowners to study birds, reptiles and amphibians in leased project areas.

- Several hundred ponderosa pines were donated to the Confederated Tribes for planting on McCoy Creek and the Upper Grande Ronde River.

Other agencies, organizations, groups or individuals worked cooperatively, or provided assistance or materials to this project, including:

- The Grande Ronde Model Watershed, Oregon State Forestry, ODFW and approximately 40 Salmon Corps members combined efforts to construct 2,180 ft. of high tensile fence on Little Creek, and plant the stream with cottonwood and willow poles. A news article in the La Grande Observer was published featuring the cooperative project (Appendix 6).

- Flip Houston of Crown Pacific donated several thousand ponderosa pines to the project.

- Chris Hyland of the Army Corps of Engineers met with the biologist to discuss new Corps funding sources and requirements and opportunities for future projects.

- Alan Bahn of NRCS assisted with planning and fence staking of the Meadow Creek/A. Cunha project.

- A used Shaver HD12 post driver was donated to the program by the USFS Wallowa-Whitman National Forest, Starkey Experimental Forest.

- The biologist consulted with Rick Wagner regarding slash piles from a logging operation along Meadow Creek. ODF agreed not to burn the piles so that the larger pieces of wood could be sorted, removed and placed into the stream in 1999.

EDUCATION:

The following educational activities were undertaken during 1998:

ODFW fish habitat staff attended the following workshops or seminars: 1) the annual meeting of the Oregon Chapter of the American Fisheries Society; 2) an AFS sponsored watershed restoration workshop 3) the ODFW Northeast Region Training session in Pendleton, and 4) a seminar on beaver management.

Surveying equipment and the solar pathfinder were loaned to Sue Daugherty of Imbler High School for collecting transect data. The high school students have been surveying Spring Creek for several years.

The biologist met with Ruth Betza to review a project on Cabin Creek and provided her with fence specifications. A natural barrier to fish migration was observed on her property.

Before/After photopoint pictures and a fence materials display were used at the Union and Baker county fairs. The displays resulted in a landowner implementing a riparian fence project in Halfway.

The biologist gave slide show presentations on the importance and management of riparian areas at Ag Conservation Workshops in Baker and La Grande.

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APPENDIX 1. Anadromous fish streams within the Joseph Creek and Wallowa River subbasins with highest priority for habitat improvement.

						Miles of Riparian Improvement					
Joseph Creek:			Stream Miles Needing Work			Fencing:		Planting:		No. of Instream Structures	
Stream	Species	Priority	Public	Private	Total	Public	Private	Public	Private	Public	Private
Peavine Creek	Stld	1	8.0	0.0	8.0	4.5	0.0	4.5	0.0	43	0
Elk Creek	Stld	2	3.5	5.0	8.5	3.5	5.0	3.5	5.0	25	35
Chesnimnus Creek	Stld	3	12.0	8.0	20.0	12.0	8.0	8.0	4.0	60	40
Crow Creek	Stld	4	1.0	13.0	14.0	1.0	13.0	0.0	10.0	10	50
Swamp Creek	Stld	5	5.0	10.0	15.0	5.0	10.0	2.5	5.0	10	20
Pine Cr. System	Stld	6	2.0	20.0	22.0	2.0	18.0	2.0	18.0	10	40
Devil's Run Creek	Stld	7	5.0	0.0	5.0	2.0	0.0	2.0	0.0	10	10
Davis Creek	Stld	8	7.0	3.0	10.0	7.0	3.0	4.0	3.0	10	0
Butte Creek	Stld	9	0.0	4.0	4.0	0.0	4.0	0.0	3.0	0	10
TNT Gulch	Stld	10	2.0	0.0	2.0	2.0	0.0	2.0	0.0	10	0
Joseph Creek	Stld	11	0.0	12.0	12.0	0.0	12.0	0.0	12.0	0	80
Subbasin Totals			45.0	75.0	120.5	39.0	73.0	28.5	60.0	188	285
Wallowa River:											
Whiskey Creek	Stld	1	0.0	7.0	7.0	0.0	6.5	0.0	5.5	0.0	26
Prairie Creek	Ch, Stld	2	0.0	10.0	10.0	0.0	9.5	0.0	8.0	0.0	37
Trout Creek	Stld	3	0.0	14.0	14.0	0.0	13.5	0.0	11.0	0.0	52
Dry Creek	Stld	4	0.0	8.0	8.0	0.0	7.5	0.0	6.0	0.0	30
Rock Creek	Stld	5	0.0	3.0	3.0	0.0	3.0	0.0	2.5	0.0	11
Parsnip Creek	Stld	6	0.0	1.0	1.0	0.0	1.0	0.0	1.0	0.0	4
Subbasin Totals			0.0	43.0	43.0	0.0	41.0	0.0	34.0	0.0	160

SOURCE: Confederated Tribes of the Umatilla Indian Reservation, 1984. Grande Ronde River Basin: Recommended Salmon and Steelhead Habitat Improvement Measures, 92 pp.

APPENDIX 2. Anadromous fish streams within the Upper Grande Ronde drainage with highest priority for habitat improvement.

Upper Grande Ronde:			Stream Miles Needing Work			Miles of Riparian Improvement: Fencing:		Planting:		No. of Instream Structures	
Stream	Species	Priority	Public	Private	Total	Public	Private	Public	Private	Public	Private
Grande Ronde River	Ch, Stld	1	6.0	5.0	11.0	2.0	5.0	1.0	4.0	130	175
Sheep Creek	Ch, Stld	2	7.0	5.0	12.0	1.0	5.0	0.5	2.5	210	175
Fly Creek	Stld	3	6.0	6.0	12.0	1.0	5.0	0.5	3.0	180	180
Spring Creek	Stld	4	5.0	0.0	5.0	1.0	0.0	2.5	0.0	150	0
S.F. Spring Creek	Stld	5	3.0	0.0	3.0	1.0	0.0	1.5	0.0	90	0
N.F. Spring Creek	Ch, Stld	6	3.0	0.0	3.0	0.0	0.0	0.0	0.0	90	0
McCoy Creek	Stld	7	4.0	7.0	11.0	1.0	7.0	3.0	4.0	120	210
Rock Creek	Stld	8	0.0	6.0	6.0	0.0	8.0	0.0	3.0	0	90
Dark Canyon Creek	Stld	9	1.0	2.5	3.5	0.0	2.5	0.0	0.0	15	38
Meadow Creek	Stld	10	7.0	7.0	14.0	1.0	7.0	0.5	0.5	210	210
Indian Creek	Ch, Stld	11	1.0	5.0	6.0	0.5	3.5	0.0	0.0	30	150
Chicken Creek	Ch, Stld	12	5.0	2.0	7.0	1.0	1.0	0.0	1.0	75	70
Catherine Creek	Ch, Stld	13	0.0	5.0	5.0	0.0	4.0	0.0	0.0	0	150
Beaver Creek	Stld	14	1.5	5.0	6.5	0.0	3.0	0.0	0.0	45	150
Five Points Creek	Stld	15	5.5	0.5	6.0	0.0	0.5	0.0	0.5	165	15
Clark Creek	Ch, Stld	16	0.0	6.0	6.0	0.0	4.0	0.0	3.0	0	180
Little Catherine Creek	Stld	17	1.0	4.0	5.0	0.0	2.0	0.0	1.5	15	60
Bear Creek	Stld	18	5.0	0.5	5.5	0.0	0.0	0.0	0.0	75	8
Limber Jim Creek	Ch, Stld	19	2.0	0.3	2.3	0.0	0.0	1.0	0.3	30	5
Pelican Creek	Stld	20	3.0	0.5	3.5	0.0	0.0	0.0	0.0	45	8
Peet Creek	Stld	21	2.0	1.0	3.0	0.0	0.0	1.0	0.5	60	30
Little Fly Creek	Stld	22	3.0	2.5	5.5	0.0	0.0	0.0	1.0	90	75
Whiskey Creek	Stld	23	1.0	8.0	9.0	0.0	4.0	0.0	2.0	15	120
Jordan Creek	Stld	24	2.0	8.0	10.0	0.0	4.0	0.0	2.0	30	120
N.F. Limber Jim Cr.	Stld	25	2.0	0.0	2.0	0.0	0.0	0.0	0.0	30	0
McIntyre Creek	Stld	26	2.5	5.0	7.5	1.0	3.0	1.0	5.0	75	150
Waucup Creek	Stld	27	5.0	0.0	5.0	0.0	0.0	1.0	0.0	150	0
Burnt Corral Cr.	Stld	28	6.0	0.2	6.2	0.0	0.0	0.0	0.0	90	4
Lookout Creek	Stld	29	3.5	0.8	4.3	0.0	0.0	0.0	0.0	53	24
Little Dark Canyon Cr.	Stld	30	2.0	0.0	2.0	0.0	0.0	0.0	0.0	60	0
Phillips Creek	Stld	31	0.0	6.0	6.0	0.0	2.0	0.0	0.0	0	180
Gordon Creek	Stld	32	0.0	7.0	7.0	0.0	4.0	0.0	2.0	0	210
Dry Creek	Stld	33	0.0	8.0	8.0	0.0	6.0	0.0	4.0	0	240
Cabin Creek	Stld	34	0.0	3.0	3.0	0.0	2.0	0.0	0.0	0	90
Drainage Totals			95.0	116.8	211.8	10.5	82.5	13.5	39.8	2,328	3,117

APPENDIX 3

Photographs

Photo #1: Pine Creek, McDaniel property, near the mouth, September 25, 1991. This stream had a serious overgrazing problem, and high bedload movement in this area. New fencing was completed in 1991 and is visible on the left bank. The landowner allowed for continued movement of the stream channel by providing a wide corridor on the right side of the stream (fence not visible).

Photo #2: Pine Creek, McDaniel property, near the mouth, October 22, 1998. Despite heavy flooding in recent years, after seven years the stream is now lush with native riparian plants. Part of stream channel has migrated to the right side of the floodplain.

Photo #3: Chesnimnus Creek, McDaniel property, August 10, 1992. Prior to project implementation the stream channel was very unstable, with many exposed gravel bars due to excess erosion. Many areas were wide and shallow, with poor vegetation or shade. Instream work consisting of bank stabilization structures and additions of large wood was completed in 1991. Fencing and plantings were completed in 1992.

Photo #4: Chesnimnus Creek, McDaniel property, August 11, 1998. After only 6 years the stream channel is now well hidden with both native and planted willows. As with the Yost property downstream, this creek responded very quickly to rest from grazing.

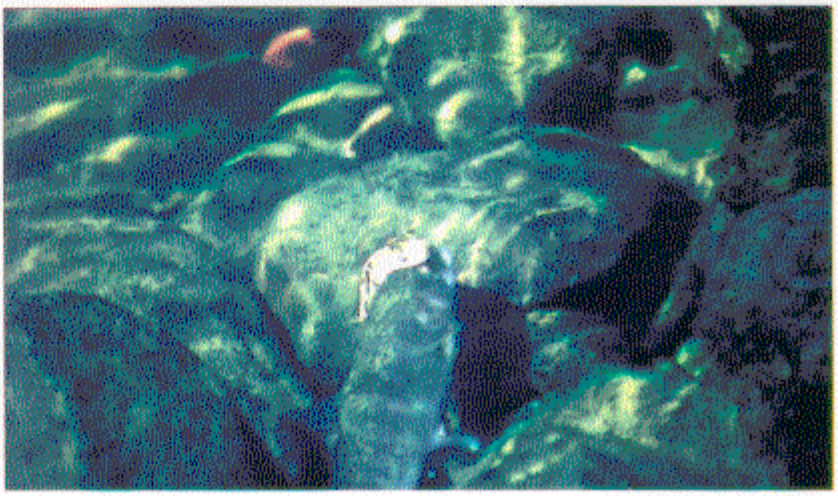
Photo #5: Salmon Creek, McClaran property, October 10, 1989. Fencing was installed in 1989, and is visible on the right bank. Some trees and shrubs were planted, but no instream work was conducted on this creek.

Photo #6: Salmon Creek, McClaran property, October 23, 1998. After 9 years of rest the stream is well shaded even in this fall picture; the large rock and fencing are barely visible. The channel has narrowed and deepened. Summer stream temperatures at this site (RM 0.1) are consistently 1.5 to 3.8 degrees Celsius cooler and fluctuate less than the upstream monitoring site at RM 2.4.

Photo #7-9: Meadow Creek, Alta Cunha Ranches property, August 4, 1999, pre-project photographs.

Stream temperatures were unusually hot this summer; the main channel to the right had lethal temperatures of 84°F at 3 p.m. However, pockets of cooler subsurface flow could be found such as occurred from this floodplain tail seep on the left.

Approximately 90 Rb/St from 2.5 to 10 inches were able to locate this cold area, which was still in the stressful range of 72°F. Fish were congregated in a shallow 1 m^2 area with no cover, making them more susceptible to disease or predation from birds, mammals or reptiles.



Elevated temperatures can also impair swimming ability of salmonids. A pair of garter snakes was observed eating these fish, which were much easier to catch under these conditions. Fencing and instream work are planned for 1999, which we hope will improve conditions by creating more complex pool habitat and eventually reduce stream temperatures.

APPENDIX 4

McCoy Creek Electroshocking Surveys

GRANDE RONDE BASIN FISH HABITAT ENHANCEMENT PROJECT:

BPA Project No. 8402500

1998 McCoy Creek Electroshocking Surveys

Vance R. McGowan, Fisheries Habitat Biologist

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La Grande, OR 97850

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Introduction

On June 29-30, 1998 the Oregon Department of Fish and Wildlife (ODFW) conducted electrofishing surveys in McCoy Creek, tributary of Meadow Creek, in the Upper Grande Ronde River subbasin. The purpose of the surveys was to repeat and compare monitoring that was originally established in 1988 within four sample stations, after the stream was fenced and following 10 years of rest from grazing. The electrofishing surveys have now become part of the monitoring program on a large restoration effort in which the landowners, Mark and Lorna Tipperman, allowed McCoy Creek to be returned to its historic (pre-1970's) channels. An interagency group that includes CTUIR, ODFW, EPA, ODEQ, NRCS, and the Union SWCD is implementing the project.

Methods

Smith-Root Model 12A-POW electroshockers were used and set at M-16, and 500 volts, which kept shocking burns and mortality to a minimum. Total counts and fork lengths (mm) were recorded on all Rainbow/Steelhead (Rb/St) trout; all other species were counted.

Three 150-ft ODFW monitoring stations established in 1988 at RM's 0.2, 0.7 and 0.9 were resampled. The lower two stations at river mile 0.2 and 0.7 are both downstream of the bridge on McIntyre Road, and remain unchanged. The station at RM 0.9 is within the de-watered area, but was sampled again because it had some flow (approximately 0.5 cfs) and cooler water temperatures. A new 150-ft station was established within the reactivated channel at RM 1.4 to replace the upper one that was completely de-watered in 1997. All stations were blocked with nets and standard pass-removal techniques (Everhart and Youngs, 1975) were utilized to estimate populations of each fish species. All Rb/St were measured; all other species were sorted and counted. Sculpins and dace were not identified by species.

Results

Percent composition of RB/St was 10.6% (Figure 1), compared to 21.6% reported last year (McGowan, 1998). Rb/St abundance based on population estimates was 675 fish/mile, or 0.10 fish/m2 (Tables 1 and 2). Abundance of all species was down considerably from 1997 (Table 2).

Length frequency data (Figure 2) indicate that 81.4% of the Rb/St captured were age-0 fish (43-60 mm), 17.4% age-1 (107-154 mm), and one age-2+ (290 mm) fish present.

Species composition within individual sample sections showed some variations due to differences in habitat types surveyed (Figure 3). Juvenile Rb/St and Cottids preferred mostly riffle habitats, while suckers and shiners were more abundant in pools or glides. Two species of dace (Speckled and Longnose) were noted but combined in the totals. Dace were the most abundant species in all habitat units. Water temperatures recorded during the sampling peaked at 25.0 ^{o}C (77 F) on June 30th, 1998.

Figure 1. Species Composition

McCoy Creek, RM 0.9 to 1.4

N = 769

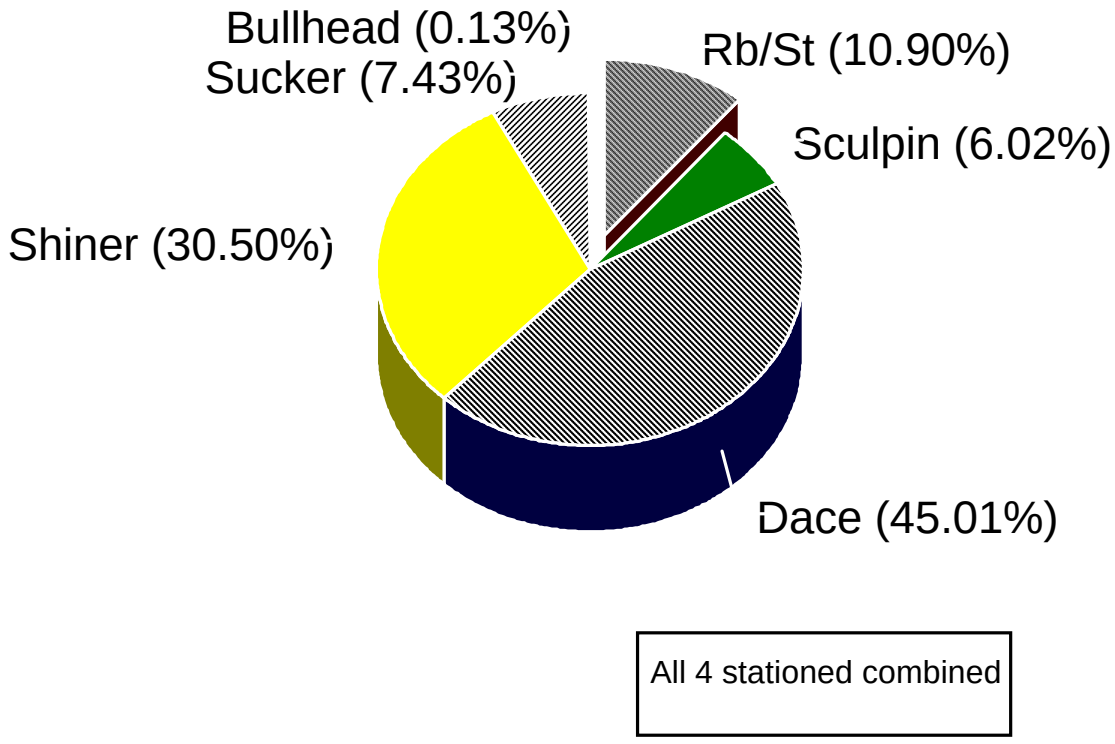


TABLE 1. Fish Population Estimates in four 150 ft ODFW Monitoring Stations of McCoy Creek, June 30, 1998.

SPECIES	SAMPLE SECTION F-1 (RM 1.4)*	F-2 (RM 0.9)	FS-1 (RM 0.7)	FS-2 (RM 0.2)	TOTALS	FISH/MI.**	SPECIES COMP.
Rb/St	28	17	27	12	84	675	10.9%
Sculpin	18	1	27	0	46	373	6.0%
Dace	192	20	101	32	346	2,787	45.0%
Shiner	143	18	57	17	235	1,889	30.5%
Sucker	15	20	13	10	57	460	7.4%
Bullhead	0	0	0	1	1	8	0.1%
Total	396	76	225	72	769	6,192	100.0%

* New Station

TABLE 2. Comparison of Fish Populations in four 150 ft ODFW Monitoring stations in McCoy Creek, 1997 and 1998.

SPECIES	1997 No. Fish**	FISH/MI.	Fish/m2	1998 No. Fish**	FISH/MI.	Fish/m2
Rb/St	284	2,286	n/a	84	675	0.10
Sculpin	221	1,779	n/a	46	373	0.05
Dace	686	5,521	n/a	346	2,787	0.40
Shiner	374	3,010	n/a	235	1,889	0.27
Sucker	163	1,312	n/a	57	460	0.07
Bullhead	0	0	n/a	1	8	0.00
Other	0	0	n/a	0	0	0.00
	1,728	13,908	0	769	6,192	0.88

Surface area not calculated in 1997.
** Calculated, based on pass-removal population estimates.
TOTAL LENGTH SAMPLED = 656 FT. = 0.124 MILES
1998 surface area (m2) = 872.11

Figure 2. Rb/St Length Frequen

McCoy Ck, all sections, 6/30/98

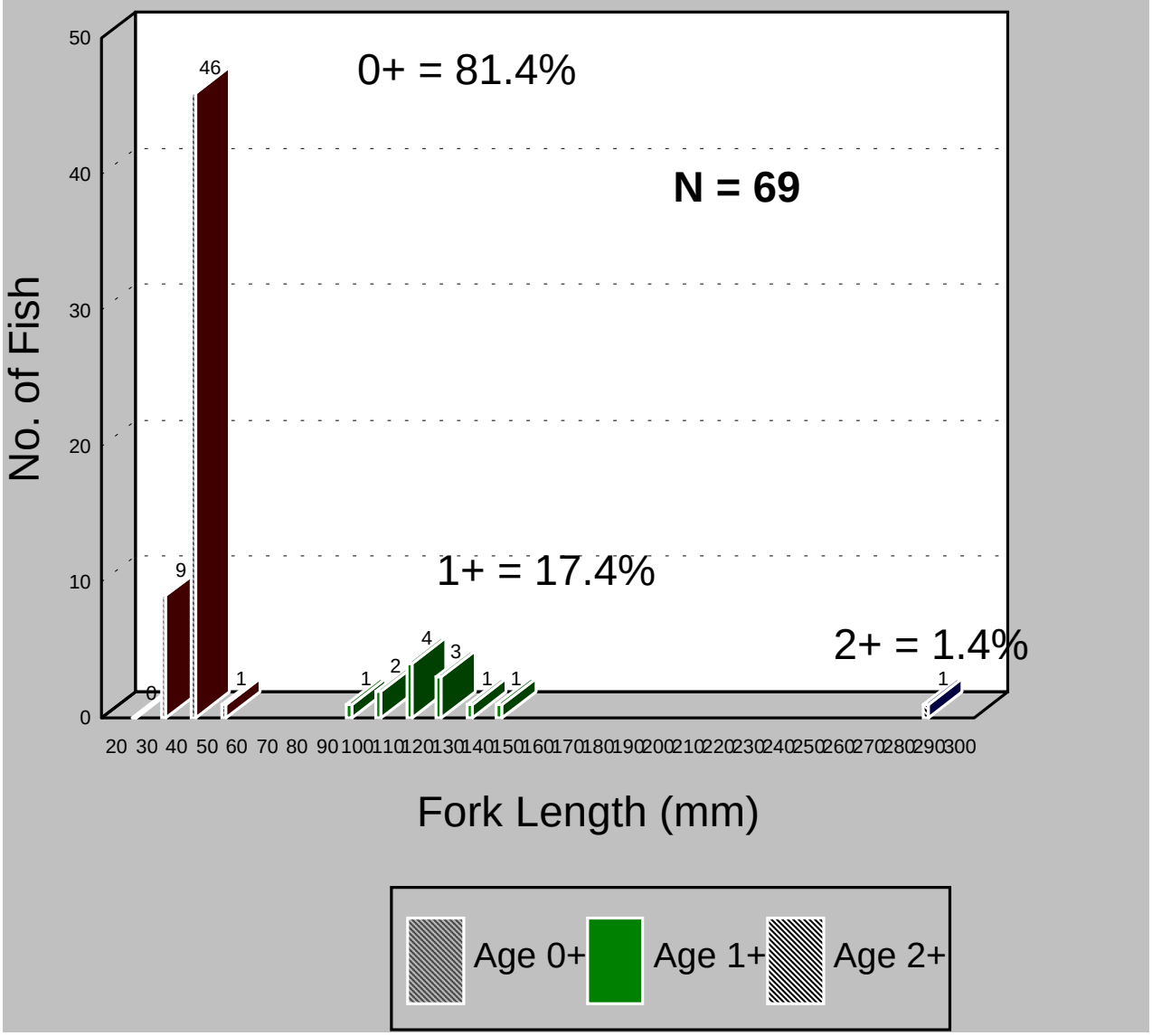
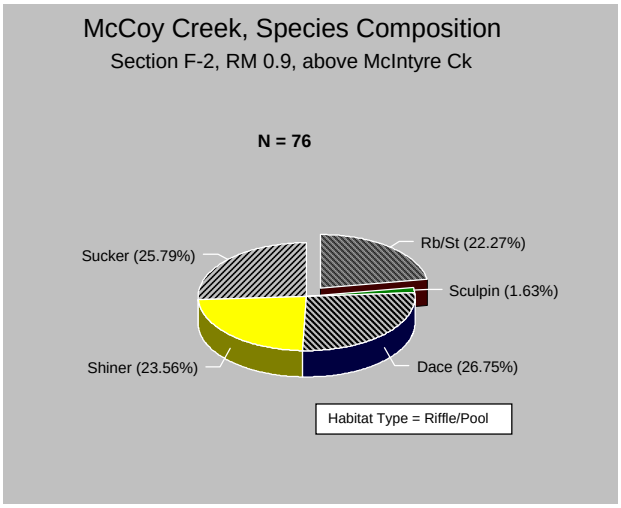
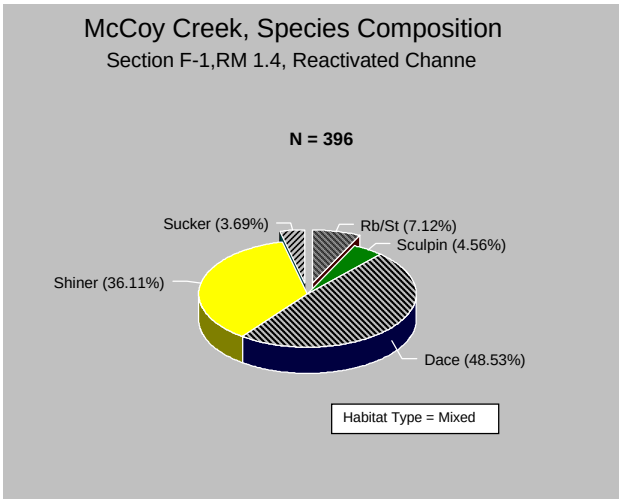
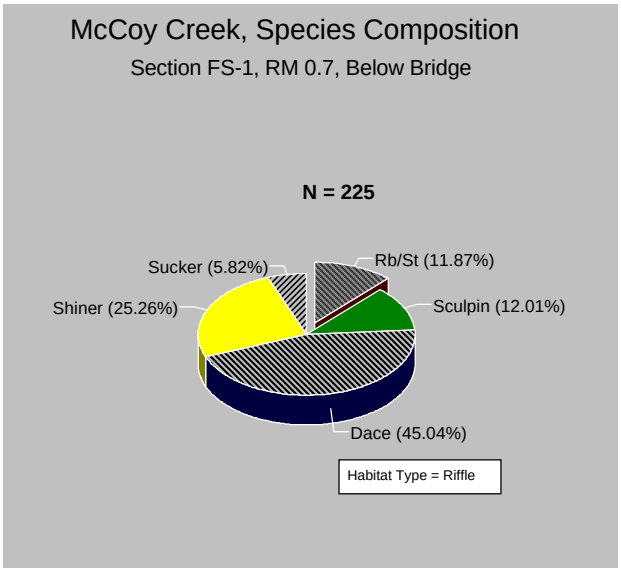
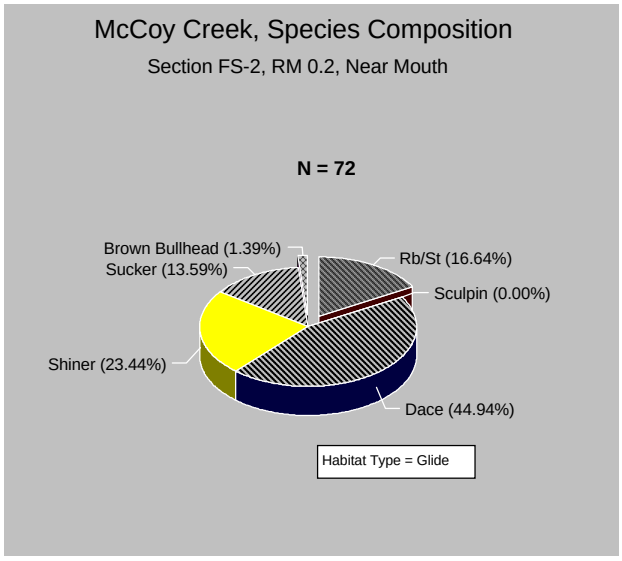


Figure 3. Species composition of fishes in four ODFW monitoring stations, June 30, 1998.









Discussion & Conclusions

Fish population estimates were not calculated in 1988 since Rb/St densities and probability of capture was low. However, percent composition based on raw data indicated an average of only 5.5% Rb/St in McCoy Creek throughout a 5 month sample period (Bailey, 1989), compared to 21.6% in 1997 and 10.9% in 1998. Jonasson (personnel comm.) reported Rb/St abundance of 375-823 fish/mile in four other Upper Grande Ronde subbasin streams in 1992 using pass-removal techniques. Abundance of juvenile salmonids is a function of many factors, including hatching success, quantity and quality of suitable habitat, abundance and composition of food, and interactions with other fish, birds and mammals (Meehan, 1991). Thus, there may be many ways to explain fluctuations in abundance of Rb/St from year to year.

The habitat in this reach has been severely altered. The section of McCoy Creek upstream of the bridge on McIntyre Road was channelized in 1977 and the section downstream channelized between 1964 and 1970. In addition, until 1988 the lower 1.5 miles of McCoy Creek, along with the lower 0.5 miles of McIntyre Creek had also been heavily overgrazed. Stream physical habitat surveys in 1992 showed 73% of the banks were classified as actively eroding and only 0.4 pieces/100m of large woody debris were observed (Moore and Jones, 1992).

Examinations of aerial photographs, established photopoints, thermograph data and riparian transect data collected over the last 10 years indicate that habitat conditions within the fenced-off lower 1.5 miles of McCoy Creek have been slowly improving since grazing ceased in 1988. For example, data collected from Solar Pathfinder's indicate that shade increased from 0.4% in 1988 to 9.6% in 1997 within transect study areas (McGowan, 1997). Increases in the percent composition of the coldwater species in 1988 versus 1997 and 1998 would suggest that improved habitat conditions have resulted in increased salmonid abundance.

It is also possible that spawning success, climatic trends, or other factors occurring in a given year may override the more subtle changes that are occurring in the habitat. For example, steelhead redds which are counted annually several miles upstream of the project area have shown an upward trend in recent years. Redd counts were 5.5 redds/mile in 1998, 5.0 redds/mile in 1997, 2.5 redds/mile in 1996, and 1.5 redds/mile in 1995 (Zakel, 1998). However, abundance of age-0 fish was less in 1998 than in 1997 even though redd counts were similar.

Stream temperatures during sampling were considerably warmer in 1998, peaking at 25.0^{o}C compared to 18.3^{o}C in 1997. This may partially explain the overall reduction in fish numbers this year. Mean weekly maximum stream temperatures during the last week of June in 1998 were 23.1^{o}C at RM 1.6, compared with the ten-year average of 21.9^{o}C for this site. Temperatures in this reach typically increase even more later in the summer, frequently exceeding the upper lethal limit for steelhead of 23.9 ^{o}C (Meehan, 1991). This could cause considerable mortality if fish are unable to migrate to cooler waters. Whether juvenile steelhead movement tends to be upstream, downstream, or if the majority of fish simply become trapped during receding flows is not known. Continued monitoring in this reach should help us better understand the range of fluctuation in fish populations, and the mechanisms that are affecting them.

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APPENDIX 5

News Articles

Ranchers, agencies in delicate balancing act as search for stream health continues.
The Observer, La Grande, Oregon, Thursday, February 19, 1998.

Salmon Corps gives Little Creek fish fin up.
The Observer, La Grande, Oregon, Thursday, March 26, 1998.

Business & Ag

Photo/RENÉ FEATHERSTONE

BALANCING CATTLE AND CREEKS: *Ed Jones shows the streamside project on his Enterprise-area ranch. He's been ranching the property since 1971. Ed and his wife, Helen, run a herd of commercial beef, farm hay and grain, and own and operate a fertilizer company. He is a certified crop adviser.*

By René Featherstone
For The Observer

ENTERPRISE – Hurricane Creek has a wild disposition, tumbling down the precipitous rise of the Wallowa Mountains before it flows through the cattle ranch of Ed and Helen Jones in rural Enterprise.

It's a tame enough stream most of the year, Ed relates, but snowmelt and rain make it swell up to where it's a raging river.

Three years ago, a fish biologist walked that stretch of the creek and then had a talk with Jones, suggesting that the cattle should be fenced out and the stream bank protected, the project to include rock abutments, natural debris and new vegetation.

"At first I was against it," Jones recalls. But after he'd mulled it over, he did come to see where the idea had merit. "That's not to say that I turned into a real greenie," Jones quips. "The new fences help with our grazing rotation; that also was a consideration for us."

It's with a measure of pride he shows off *his* creek, even though it means a few less head of cattle he can graze. He remembers when Chinook salmon spawned here – "the last time we saw them was in 1991" – and how impressive it was watching the large fish struggle upstream, beating themselves against rocks in the water that seemed much too shallow for them.

PROJECTS AIM AT STREAM HEALTH

The riparian conservation effort at the Jones ranch, designed by the Oregon Department of Fish and Wildlife and paid for by Bonneville Power Administration funds, focuses on habitat for salmon and prevention of Hurricane Creek flooding.

The Farm Service Agency (the federal FSA) likes to use the Jones' ranch riparian project and similar ones as examples of how local producers can help improve the general health of Northwest streams through an offshoot of the Conservation Reserve Program called the Continuous Sign-Up for High Priority Conservation Practices.

More is at stake than salmon recovery, says Bill Williams, FSA county director in Enterprise.

"Here in Wallowa County, the water temperature of the streams is the biggest concern that needs to be addressed," he said, explaining that the Continuous Sign-Up program applies to a broad range of conservation practices — riparian buffers, filter strips, grass waterways, shelter belts, field windbreaks, living snow fences, contour grass strips, salt-tolerant vegetation and shallow water areas for wildlife.

Jennifer Isley, Union County FSA director, elaborates that the agency administers the program and provides the monies, whereas the NRCS (Natural Resource Conservation Service) handles the technical aspects.

"The NRCS makes the land eligibility determination. ... They come up with a conservation plan that's agreeable to the producer, based on what the producer wants to do," she says.

Williams and Isley are both a bit stumped that locally no one has signed up for the program that started in 1996. In fact, statewide only 19 contracts amounting to 294.8 acres were awarded as of Sept. 30, 1997, said the State Program Specialist Fred Ringer in Tualatin.

But Ringer remains hopeful that the CRP offshoot will become a success.

"We think we'll see a substantial increase (in riparian strips enrolled). More and more producers recognize land resource concerns, and are trying to solve the problems."

Isley and Williams note that there is interest in the program. Williams said that the FSA reimburses the producer 50 percent of the conservation costs. There are no fixed dates to bid by.

ONE OPTION FOR RANCHERS

As for Ed Jones, he doesn't exactly endorse the Continuous Sign-Up CRP, but he thinks it's a program worth looking into, as one option of stream enhancement on ranches.

He relates how he was surprised that the project ended up more extensive in acreage than he'd anticipated, but that's offset by the amount of land he lost to flood erosion. "Since 1980, when we bought this place, the creek's eroded about 90 feet of bank," he explains.

Jones found that government experts from different agencies have varying opinions on how to go about riparian conservation.

"The local soil conservation people believe in structure; the fish and wildlife people don't," he says.

In his case the structure approach won out, probably because of the flood threat to the nearby salmon hatchery, Jones suspects.

"They decided to protect the bank with rip-rap. It's dense limestone from a pit up the Lostine River."

Another disagreement between the experts was cottonwood propagation.

"The conservation guys told us to bury big cottonwoods under the rip-rap and under gravel. Doing that should establish new trees, they said.

"But the fish and wildlife guys said that won't work. We went ahead and did it, so I guess we'll find out who's right."

Jones emphasizes that the project on his ranch is not yet complete. Fish and Wildlife will plant more native shrubs in the area.

The Joneses also learned something about cows they'd not realized before.

"The biologist pointed out to us that cottonwoods, when they get old, send up new trees from the old root system. The cattle love to eat those new shoots. We'd never noticed that before. It's kind of nice to see all the little new cottonwood trees coming up."

Williams stressed that the project on the Jones ranch is only one example of what the FSA will help finance; he indicated that riparian conservation does not necessarily have to be as involved, depending on the individual site.

REASONS FOR RELUCTANCE

John Williams, the OSU natural resource county extension agent in Wallowa County, suspects that one of the reasons for so few sign-ups in the program is the exclusion fencing that's stipulated by the FSA.

"I think that's where the real battle is — the exclusion fencing. I believe that most ranchers are interested in improving riparian habitat, but they feel that there are other tools than livestock exclusion.

"For instance, a producer can fence off riparian pasture and manage it separately; or, without any fencing, the riparian areas can be managed properly by specific timing, duration, season and quantity of the livestock grazing there," Williams explains.

"My own gut feeling is that exclusion fencing jump-starts riparian recovery faster. However, it also means that the landowner is giving up more," he adds.

He theorizes that the reason the FSA insists on exclusion fencing is that, "it's the surest way in the eyes of the government."

Williams notes that "the long-range biological benefits and costs of exclusion fencing are not really known. Right here in Wallowa County we have exclusion fencing that's 40 years old, and some of that riparian area doesn't look all that good."

Williams also makes a point of mentioning that there are local ranchers who have improved their streams without government help.

The bottom line, he stated, is that assessing the best option for riparian management is a matter of "looking at everything, one acre at a time."

The Observer, La Grande, Oregon, Thursday, March 26, 1998

Salmon Corps gives Little Creek fish fin up

UNION — The rain stopped for most of Wednesday — long enough for the Salmon Corps to plant trees and build a fence along Little Creek.

The corps, a group of young people from several reservations in the Northwest, lined the banks of the creek on Norman Kerr's ranch near Union, pounding posts for a fence and digging holes for small trees.

When they were finished, 2,200 feet of fence protected the creek banks from grazing cattle and 500 willows and cottonwoods were in place.

The planting was organized by the Grande Ronde Model Watershed. The Oregon Department of Fish and Wildlife donated fencing materials, and the Oregon Department of Forestry provided help with the work and donated equipment.

"I'd been looking for a way to protect the creek for awhile," Kerr said.

The Salmon Corps had gathered in La Grande for a career and outreach conference at Eastern Oregon University.

The corps is based on the Peace Corps concept. Young volunteers work for one year, earning expense money, and at the end of a successful year they receive a $4,725 scholarship.

Most of Wednesday's volunteers came from the Umatilla, Yakama, Shoshone-Bannock, Warm Springs and Nez Perce tribes.

The Observer/ERIN WITTEN

RIPARIAN WORK: *Davina Spoonhunter fills in a posthole as Phillip Smith and Tank James level a post for a fence line being installed by the Salmon Corps. All the workers are from Yakima, Wash.*